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WHAT THE BUSINESS WORLD DEMANDS.

The business world of today demands speed, not haste; loyalty, not sycophancy; service, not time serving; knowledge, not pedantry; the nerve to take a fighting chance and the courage to acknowledge mistakes.—George A. Murphy.

A Sound Financial Forecast.

Charles G. Dawes, president of the Central Trust Co., of Illinois, recognized as one of the most successful financiers in the country, struck the right note in an address he delivered before the Chicago Real Estate Board last week. It was, tersely stated, that there is no reason why fortunate nations must suffer with unfortunate. His argument was that, because Europe is aflame with a destructive war, it need not follow that the United States must endure a period of industrial and financial sickness.

"Nations are like individuals," said Mr Dawes. "They are rewarded according to their industry or lack of it. We are peaceable and industrious. Our people are at work and not in arms. Why, then, should we suffer along with the nations that are at war? The idea that we must so suffer is monstrous and contradicts moral as well as economic sense. Peace and industry, like virtue, are their own reward. This is not orthodox, but it is true."

There is a vast amount of encouragement in this line of reasoning, and Mr. Dawes proceeded to show figures to prove his contention. "Foreign trade is only 1 per cent. of the total of our trade. Normally it is a negligible quantity. If we should lose 33 per cent. of this commerce, it would mean a loss of only one-third of 1 per cent. of our business as a whole. What the war has done, was to sweep away a lot of rules and rates to which political economists held fast.

"One day a man on Mars saw Europe a busy and thriving community. The next day he saw this same Europe turned into a continent of barbarism; turned back, as it were, ten thousand years. Hence entirely new conditions confronted the economic world. New problems arose. The conventional phrases of the past were no longer appropriate. Conventional usages became useless.

"It is clear, however, that we, who are at peace and are industrious, do not need the world as the world needs us. The war, indeed, will put a premium on prosperity. We have everything needed to prosper; great crops and high prices for the crops.

"The First National Bank of Boston points out that, for the week ending October 8, while 66 cities registered losses, 44, mainly in the Middle West, showed an actual gain in bank clearings. Eliminating New York, where the stock exchange is closed, the decrease for the country at large was only 8 per cent.

"While foreign exchange is high, exports are exceeding imports in good amounts. Wheat exports are now running at 25 per cent. over last year. Grain shipments of all kinds are heavy. With the opening of the federal reserve banks we should expect easier money. In Chicago and New York, the reduction in reserve requirements of the law, from 25 per cent. to 18 per cent., should release approximately $140,000,000 in cash. Again, the reserves deposited with the federal reserve banks will become the foundation of other credits. This should greatly facilitate the retirement of outstanding clearing house certificates and the Aldrich-Vreeland notes. The strain upon credits and upon currency should soon commence to lighten. The activity in the business of food products should soon be reflected in a demand for manufactured products, which food producers must use. Reviving confidence will soon give its impetus to the onward movement, and when once finally launched, the new prosperity will be one of the greatest this country has ever enjoyed."

While Europe Fights, America Prospers

By HERBERT KAUFMAN

It's here! Your chance has come. Half the world had to be blown off the map to produce the opportunity. More billions of pounds, francs and marks' worth of assets than the total created wealth of the world five hundred years ago had to be smashed to smithereens—nobody knows how many leaders in manufacturing, shipbuilding, railroading, finance, merchandising, chemistry, medicine, engineering, electricity, dyeing, weaving and publishing, not to mention an indefinite number of less important but quite useful folk—had to be lost in the cataclysm, to arrange matters for your benefit, but at all events you are one of the residuary legatees of the still vast, valid estate.

Now make good—you're nailed. We've always suspected you, but you were so confoundedly plausible with your excuses—so clever with your explanations of how you just missed it, that we gave you the benefit of the doubt and—another try. But you won't "get by" again, unless you produce the goods.

If you ever before had an idea, you never before had such a market for it. If you ever possessed business acumen and judgment, you'll never again face a universe so sadly in need of your gifts.

The bomb that burst at Sarajevo temporarily paralyzed the development of half the world. For years to come Europe must chafe in handcuffs—bereft of recourse and resource—and turn to America for the alleviation of her necessities. Last year it was twice as difficult to merchandise yourself or your wares—to get a hearing and to get ahead—because now there is only half the rivalry that existed then.

This is not an urge to capitalize our neighbors' woes. On the contrary, it is a suggestion to get busy and lighten them. The more we help ourselves, the quicker we analyze the situation and sensibly set about relieving the world-strain, the sooner we repair the universal tears and snags and patch up the broken machinery—the better off everybody will be.

Here and there a flying splinter or a chip of shrapnel has figuratively flown across the Atlantic and actually injured an isolated interest, but, man alive! such cases don't count—ninety-nine per cent. of us never had less reason to worry about our material prosperity. There's a silver lining to every war cloud, too, and it's all showing on our side of the ocean.

There are mouths to feed and backs to clothe, prescriptions to fill, automobiles and farming implements to produce, shoes to be furnished and steel to supply. It's just as though half the stores in the country were suddenly closed—half the farms abandoned, half the factories and laboratories shut down. It doesn't take much imagination to figure that the active merchants and farmers and manufacturers would have everything their own way; and yet, that's just what has occurred. Hard times are impossible under these conditions. The most superficial analysis proves it.

Shed a tear in the name of decency and humanity over the appalling tragedy, but, in the name of good citizenship and good sense, simultaneously help devastated lands and your own country by spreading cheer among the blinded doubters whose pessimism is retarding a necessary and immediate boom.

By every law of logic and profit there shouldn't be a still wheel or a clean smoke stack on the whole continent. By raising our production to its maximum limits, we can not only create enormous fortunes for ourselves, but at the same time so reduce costs that we can also lighten the misfortunes of our kinsmen yonder. History won't repeat the present performance in your lifetime. It's your best ax and biggest chance.

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Transmission—Temperature Changes and Line Insulation

The Effects on Telephone Transmission of Variation in Temperature and of Low Line Insulation—Relative Magnitude of These Factors in Cases Commonly Encountered in Telephone Line Construction—Some Practical Illustrations of the Theory

By N. N. Smith

The general effect of low line insulation on telephone transmission is well known. In the construction of a well built, modern long distance telephone pole line, special precautions are taken to prevent leakage over the cross arms and at the terminals during wet weather, by the use of special insulators and special construction methods. It is believed, however, that the exact relation between the degree of insulation of the line and the loss in transmission is not generally known. It is also believed that the effect of changes in temperature on telephone transmission is not generally appreciated. This latter effect cannot be so easily overcome by the use of special construction methods as can the effect of low insulation, but it should, nevertheless, be taken into account as one of the limiting factors in the design of a long distance telephone plant. It is the purpose of the present article to show how the effect of these two factors, namely low line insulation and changes in temperature, may be estimated and what their relative magnitude is in some cases commonly met with in telephone line construction.

The temperature changes which need be taken into account are the extreme seasonal changes during the year. In the case of underground cable such changes are not great, at least in the Temperate Zone. Furthermore, the effect of temperature on the electrical constants of telephone cable cannot be calculated in advance without being based on experimental data, and transmission is not affected to as great an extent as in the case of an open wire line. Wet weather does not affect telephone cable transmission at all, while the temperature changes which occur in the case of underground cable are of relatively slight amount. For this reason only open lines will be considered in this article. We shall also asume that the extreme variation in temperature of the wires, which will occur, is from —20 degs. Fahr. to +110 degs. Fahr. This is probably the maximum variation in the northern part of the United States for wires exposed to the direct rays of the sun in summer and extreme weather conditions of winter. A range of from zero Fahr. to + 90 degs. Fahr. would more nearly represent the maximum seasonal variation of ordinary years, but the first figures have been used in the computations, that follow, to represent the extreme conditions which may occasionally be met with.

Propagation of Voice Current Along Telephone Line.

In order to understand the effect which changes in insulation and temperature have on telephone transmission, it is necessary to consider the theory of the propagation of voice currents along a telephone line. The simplest case to consider, from the theoretical point of view, is a line infinitely long with a sinusoidal electromotive force of constant effective voltage impressed upon one end of the line. It is usually satisfactory in transmission calculations, to consider a frequency of 800 periods per second as representing, in an average way, the combination of frequencies which make up the actual telephone currents in a telephone line.

Let E_o represent the potential impressed upon the line, I_o the current flowing in the line and Z_o what is commonly known as the initial sending end impedance. Then, as we move along the line from the sending end, there is a decrease in magnitude, or attenuation, of both the impressed voltage and the current flow, which may be expressed in the following way:

Let l be the distance from the sending end of the line to the point considered. Then the potential E and the current I at this point will be given by the equations

$$E = E_o\ \epsilon^{-Pl} \qquad \ldots\ldots(1)$$

$$I = \left(\frac{I_o}{Z_o}\right)\epsilon^{-Pl} \qquad \ldots\ldots(2)$$

where ϵ is the Naperian base. P is called the propagation constant and may be expressed in symbolic terms as $P = a + j\,b$ where $j = \sqrt{-1}$; a and b may be expressed in terms of the electrical constants of the line and are very important for practical computations of telephone transmission.

$$a = \sqrt{\tfrac{1}{2}\left[\sqrt{(R^2+p^2L^2)\,(S^2+p^2C^2)} + (SR-p^2LC)\right]} \qquad \ldots\ldots(3)$$

$$b = \sqrt{\tfrac{1}{2}\left[\sqrt{(R^2+p^2L^2)\,(S^2+p^2C^2)} - (SR-p^2LC)\right]} \qquad \ldots\ldots(4)$$

where

R = loop resistance of the circuit in ohms per mile
L = inductance, in henries per mile
C = mutual capacity in farads per mile
S = mutual conductance in mhos per mile
$p = 2\ \pi$ times the frequency.

R, L, C and S are all measured from the sending end, a distance l along the line.

For the practical telephone engineer formula (3) is the most important of the above formulas, since it gives a working formula for estimating the loss in the amount of current and voltage transmitted over the line, and consequently will give an indication of the efficiency of the line for telephone transmission. Formula (4) gives an indication of the angle of lag of current and voltage, but this is found to be of less importance in practical transmission problems than the attenuation (3). Although formula (3), as developed, applies strictly to a line of infinite length, it may be used to compare the loss in transmission over actual working telephone lines of limited length, and is found to check with actual tests and measurements to a remarkable degree of precision. This formula may be applied to either open wire lines or cable. It holds also for a line which is loaded with Pupin inductance coils.

In order to apply this formula to computations on actual telephone lines, it is necessary to carry out the computation to several significant figures as the term p^2LC will be found to very nearly equal to the remainder of the terms under the radical so that, unless the numerical work is carried out to several places, the result will not be accurate. For this reason the formula is not well suited to engineering work. It may be remarked in passing, however, that in the case of telephone cable not loaded with Pupin inductance coils, L and S are small compared with R and C. Therefore, we have in this case, as an approximation, by putting $S = 0$ and $L = 0$, the formula $a = \sqrt{\tfrac{1}{2}\,p\,CR}$. This is a well known formula and is the basis for the familiar statement that the transmission loss in a telephone cable is proportional to $\sqrt{CR}$.

For open wire lines constructed with hard drawn wire under modern specifications, changes in temperature and weather conditions will have practically no effect on the capacity C and resistance L, and we need only consider as variables in such cases, the loop resistance R and the mutual conductance S, or its reciprocal, which is the mutual insulation leakage r.

The variation in the loop resistance R with temperature

may be computed from the formula for the temperature co-efficient for hard drawn copper wire. Such wire has a conductivity of about 97.3 per cent. compared to pure soft drawn wire. Besides the change in resistance, there is also a slight change in length of the wire, due to temperature changes. However since the co-efficient of linear expansion for copper is only about .0000097 per deg. Fahr., this latter effect can be neglected.

The variation in the mutual conductance S, or mutual insulation leakage r, depends principally upon the precipitation and humidity. On the best modern constructed lines, the mutual insulation, even in wet weather, should not fall much below 100,000 ohms per mile, which would correspond to $S = 10^{-5}$ mhos. The mutual conductance S may therefore, be assumed to vary from this value down to zero.

In order to exhibit the effect of changes in R and S on transmission, we shall take as an example a telephone line made up of No. 12 N. B. S. gauge, hard drawn copper conductors carried on the cross arms of a pole line with the usual construction as adopted today for long distance lines. The constants L and C of such a line may be assumed to be as follows, from actual measurements: (See Fleming "Propagation of Electric Currents in Telephone and Telegraph Conductors," p. 256.)

$$L = .0037 \quad \text{henry per loop mile.}$$

$$C = \left(\frac{.0085}{10^6}\right) \text{farads per loop mile.}$$

Consider first the effect of temperature alone: In this case we may assume there is no leakage between conductors so that $S = 0$ Bulletin No. 31 of the United States Bureau of Standards, "Copper Wire Tables," showing how to compute the variation in resistance R, which is the only other electrical constant which need be considered. Fig. 1 shows graphically how great a variation this will amount to for hard drawn copper wire—conductivity 97.3 per cent.—taking the resistance at 60 deg. Fahr. as normal.

It will be seen that between the extremes of —20 degs. Fahr. to + 110 degs. Fahr., there is a variation in resistance from

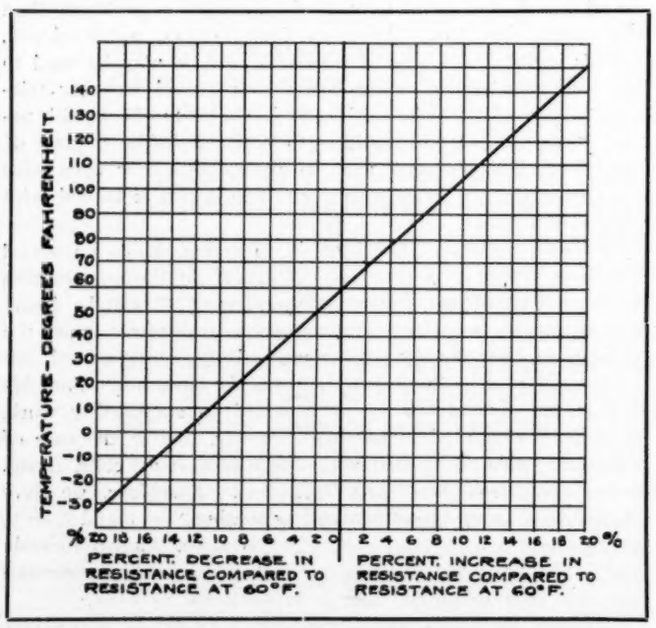


Fig. 1. Resistance Variation of Hard Drawn Copper Wire.

17 per cent. below to 11 per cent. above the assumed normal.

According to Bulletin No. 31 of the Bureau of Standards, the resistance of No. 12 N. B. S. hard drawn copper at 60 degs. Fahr. is .9676 ohm per 1,000 ft. which amounts to 10.2178 ohms per loop mile. The resistance for temperatures other than 60 degs. Fahr. may be estimated from the relation shown in Fig. 1.

In case it is assumed that the telephone line is loaded with Pupin inductance coils, allowance must be made for the increase in line resistance and inductance due to their use.

Assumed Temperature. Degs. Fahr.	Non-Loaded Circuit $L = 3.7 \times 10^{-3}$, $S = 0$, $C = .0085 \times 10^{-6}$		Circuit Loaded with Inductance Coils $L = 30.0 \times 10^{-3}$, $S = 0$, $C = .0085 \times 10^{-6}$	
	R (Ohms)	Attenuation, a, per mile	R (Ohms)	Attenuation, a, per mile
— 20	8.450	.00625	9.112	.00242
0	8.889	.00656	9.585	.00254
+ 20	9.329	.00687	10.059	.00267
+ 40	9.778	.00718	10.544	.00280
+ 60	10.218	.00748	11.018	.00293
+ 80	10.657	.00778	11.492	.00306
+ 100	11.097	.00808	11.965	.00318
+ 120	11.536	.00838	12.681	.00337

Variation in Attenuation Factor Due to Temperature.

Published results regarding the electrical constants of these coils, as they are used on the lines of the Bell system today, are very meager. The coils in use today are generally spaced at 8-mile intervals and are said to have an effective resistance, at a frequency of 800 periods per second, of about six ohms, and to bring the inductance of the line per mile up to about .03 henry.

Applying these values, we are now in a position to calculate the attenuation constant, a, for No. 12 N. B. S. hard drawn copper circuits, of both loaded and non-loaded open wire, by means of formula (3). Substituting the proper values of R, L, S and C in formula (3) and assuming $p = 5{,}000$, which is the value corresponding to the average telephonic frequency of about 800 p. p. s., we may calculate the values of a for any desired temperature.

The result of such a computation is given in the accompanying table. It will be noted that a change of temperature from one extreme (— 20 deg. Fahr.) to the other extreme (+ 110 degs. Fahr.) increases the attenuation, a, from .00625 to .00838 in the case of a non-loaded line, and from .00242 to .00337 in the case of a loaded line. This is an increase of roughly one-third. The computations are for a No. 12 N. B. S. circuit.

For purposes of practical telephone work, it is usual to express the relative talking efficiency of any given line in terms of the efficiency of a certain type of No. 19 B. & S. gauge cable, which has been generally adopted as standard. The attenuation of this standard cable may be taken as .107 (see Fleming "Propagation of Electric Currents in Telephone and Telegraph Conductors," p. 256).

If, therefore, .107 is divided by the values for the attenuation shown in the table, we shall obtain the number of miles of No. 12 N. B. S. open wire line which has a loss equal to that of a mile of standard cable for each assumed temperature. This relation is shown graphically in Fig. 2 for both loaded and unloaded No. 12 N. B. S. gauge copper conductors. It will be noted that there is a difference of approximately 30 per cent. between the transmission equivalents at temperatures of — 20 degs. and + 110 degs.

Assuming that we get actually this much difference in practice, to form an idea of how much effect this amount of change in the attenuation will make in actual transmission, consider a telephone line 500 miles long, with transmitting and receiving stations connected directly to the line at each end. For such a line, No. 12 N. B. S. conductors would commonly be used. According to Fig. 2 at a temperature of — 20 degs. Fahr. transmission over the line would be equiva-

lent to that over a standard cable about 29 miles long. This is generally regarded as a commercial grade of toll transmission. However, such a line, on a clear, hot, mid-summer day might be subjected to temperatures of something like + 110 degs. Fahr. From the curve, 500 miles of No. 12 conductor at this temperature equates to 38 miles of standard cable or nine miles more than at a temperature of —20 degs. Fahr. Transmission over such a circuit is hardly possible on a commercial scale. Furthermore, we have assumed that the insulation was so high that S is practically negligible. As a matter of fact the insulation is rarely good in seasons of high temperature, except in excessively dry localities. High temperature is usually accompanied by fairly high humidity which will lower the insulation. Thus in actual practice the attenuation will be greater than the value shown in Fig. 2 for +110 degs. Fahr. Low temperatures, on the contrary, are usually accompanied by high insulation.

If a loaded line of No. 12 conductors be considered and the curve shown in Fig. 2 be applied, we have the following results: A line 1,000 miles long will equate to about 23 miles of standard cable at — 20 degs. Fahr. Transmission over such a circuit under such conditions should, therefore be fairly good. However, at + 110 degs. Fahr., according to Fig. 2, the same line would equate to 30 miles of standard cable, which is considered poor. Taking into account reflection and other losses at the terminals, transmission in such a case would hardly be considered commercial.

The writer does not know whether any tests on actual telephone lines have been made which confirm these results. The effect, however, should be noticeable, even if these results should prove to be too large. It is probable that this effect, if it has been noticed, has not been recognized on account of the effect of changes in insulation which usually accompany temperature changes. Summer temperatures are usually accompanied by thunder storms and relatively high humidity and low insulation, while the low temperatures of winter are usually accompanied by excessive dryness of the atmosphere with consequent high insulation. The computations show, however, that the effect of temperature alone, on telephone transmission over open wire lines, may amount to a considerable figure.

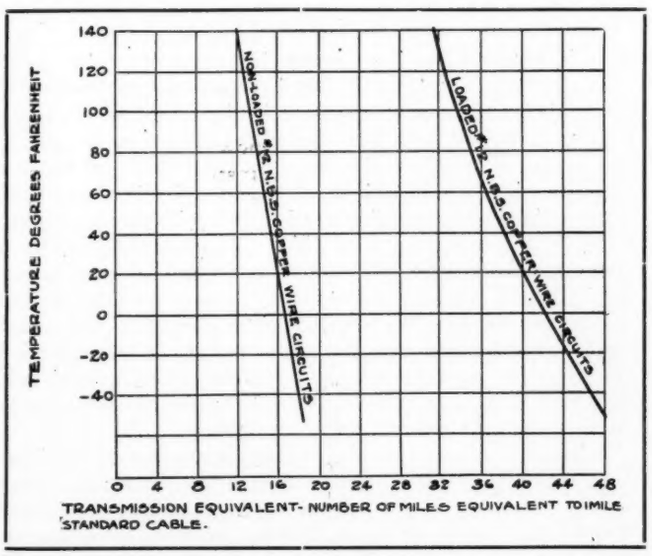


Fig. 2. Transmission Equivalent Variation With Temperature.

If both the change in resistance and the change in insulation of an open wire telephone line be taken into account with change in weather conditions, a much greater effect will be found on transmission, due to the combined results of insulation changes and temperature changes. Formula (3) may be used to compute such effect, if values for S and for R corresponding to the different conditions are assumed. As already noted, S may be assumed to vary from $S = 0$ to $S = 10^{-5}$ mhos is a well costructed line, while R may be assumed to vary corresponding to temperature changes as previously shown.

The results of computation with formula (3) are shown in

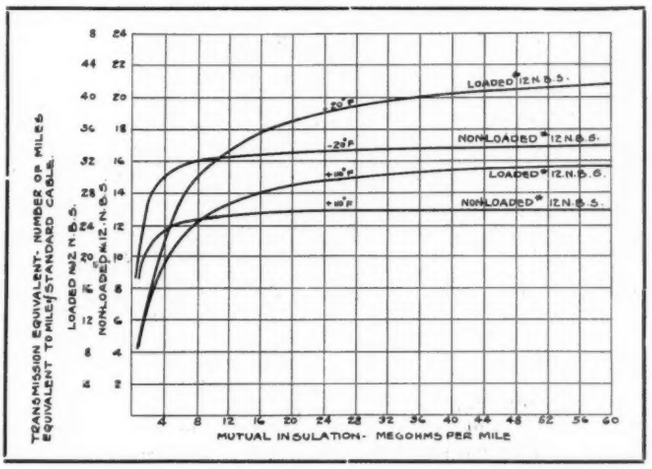

TRANSMISSION EQUIVALENT- NUMBER OF MILES EQUIVALENT TO MILE STANDARD CABLE.
LOADED #12 N.B.S.
NON-LOADED #12 N.B.S.
LOADED #12 N.B.S.
NON-LOADED #12 N.B.S.
-20° F
-20° F
+110° F
+110° F
4 8 12 16 20 24 28 32 36 40 44 48 52 56 60
MUTUAL INSULATION- MEGOHMS PER MILE

Fig. 3. Variation With Insulation and Temperature.

Fig. 3 in the form of curves. Four curves are given, two for lines which are loaded with Pupin coils, and two for lines which are unloaded. Temperatures of + 110 degs. Fahr. and — 20 degs. Fahr. were used as extremes. The curves show the effect of different degrees of insulation at both of these temperatures.

It will be noted that there is a sudden drop in each of the curves after the insulation falls below a certain point, which varies for the different curves. This is true whether the line is loaded with Pupin coils or not. It appears that for all conditions illustrated by the curves, when the insulation falls below about 5 megohms per mile, there is a serious loss in efficiency of transmission. It is therefore important to keep the insulation up. At temperatures as low as — 20 degs. Fahr., however, the insulation will hardly fall as low as is shown in the curves.

Although these curves are made up for No. 12 N. B. S. copper conductors, similar curves apply to any open wire lines. It is apparent from the curves, that changes in temperature and insulation must have a relatively large effect on telephone transmission over open wire lines even with modern construction and precautions as to insulation of the line.

Improvements at Butler, Pa.

The People's Telephone Co., of Butler, Pa., has been putting in a busy summer and many improvements in the line of equipment have been added to the plant. Considerable cable has been installed during the past few months and a number of extensions to rural lines have been completed.

An addition has been made to the main exchange located at Butler and a new switchboard installed. At Chicora, Pa., a new three position, multiple switchboard has been installed. At Bruin, Pa., a hundred-line switchboard has been erected. An addition has also been made to the Eau Claire, Pa., exchange. There has also been a steady increase in toll traffic and 363 new subscribers have been added to the company's exchange. Plans are being made for extensive cable work. Daniel Younkins is president, J. H. Troutman is vice president; T. M. Baker, secretary; T. J. Shufflin, treasurer and general manager, and J. E. Forsythe, general superintendent.

Inconsistencies in American Telephone Practice

A Discussion of Methods of, and Practices in, the Plant, Operating and Executive Departments of Telephone Companies, Which are not Economical When Viewed from a Combined Engineering and Commercial Standpoint—The Toll Plant—Eighth Installment

By Constructive Critic

A very common error made by long distance telephone plant operators is to be over-sanguine in their estimate of the probable traffic density that will be realized during the life of the poles. Thus, they will often erect very expensive tall poles, and guy them heavily in preparation for carrying a large number of circuits, which condition may never be realized. More ventures have failed, due to involving too much money in over-building, than in under-building. Managers and engineers have often been censured for building improvidently when some condition arose that made it necessary to string more wires over a lead than was first contemplated. However, there are very few cases where this has occurred. If a very careful analysis were made, it would be found that the judgment used was actually fortunate to the company.

Commercial Aspect of Toll Line Building.

The life of poles being a little over ten years, the depreciation upon them has been assumed to be approximately 10 per cent. per annum, where no depreciation fund is set aside. However, no two "experts" have been known to agree upon the proper percentage. Therefore, if a considerable sum of money is required to be spent, in the last years of the life of the poles, to guy and brace them in order that they may support an increased load, or if it is necessary to abandon the lead and erect a new one, it will be found that the increased first cost and increased depreciation which would have been chargeable against the more expensive lead, would go a long ways toward replacing or strengthening the less expensive lead, when found necessary. In any event, there would be no accrued depreciation against the lead when rebuilt.

It should be borne in mind that, while shorter poles do not lend themselves so readily to resetting after butt decay, it is not necessary to set short poles so deep, nor is it necessary to resort to placing the same number of guys on a given lead of short poles as on tall ones. The same tensile strength in guys for tall poles is not required for short ones. This means a reduction in first cost of material and labor. It therefore may be economic advantage to reconstruct anew when pole butts have become decayed, rather than incur larger investment and larger carrying charges during a long period of years. The expense of resetting poles, replacing decayed cross arms and reconstructing guys is usually found greater than anticipated. It is difficult to anticipate demands beyond the life of pole butts; aerial leads may require replacing by underground ducts or it may become necessary to radically change the location of the lead or a large portion of it.

The progressive spirit of managers and engineers quite often overbalances their cooler business judgment when building a toll system. Instead of making a most careful traffic survey of the territory, based, perhaps, upon the business derived by the company already in the field, if there be one, they will assume, upon the off-hand statements of a few community boosters, that a heavy traffic will come to them. After their lines have been constructed and the competing company has improved its service and changed its method of doing business and its attitude toward the patrons, a most discouragingly small traffic will usually result. The "dear public" soon forgets the indignities which a company before has heaped upon it, as well as the earnest promises that it may make to the new company, of the support which it will give. One company is usually played against the other without compunction.

In the ambition to outdo a competing company, the new builders will often ramify an extended territory in place of selecting the courses of densest traffic and adhering to them most religiously, while letting the other fellow build the leads in territory that will supply only scant business for one pair of wires. There are many instances in this country where small toll systems have been built and have prospered. Later, the desire to gain the prestige of having extremely long lines, has led to the construction of extensions, only to find them poorly patronized; and, as a result, not only a loss in themselves, but that they have dragged the whole system into a losing venture.

It is not infrequent that we find, in the desire to build a strong lead, although only one pair of wires is to be strung, an excessive sum is spent in the pole line construction. Then an endeavor has been made to economize by stringing iron wire where the nature of the traffic really warrants copper service—the wire forming but a small portion of the total investment but being the vital element in determining satisfactory transmission and service qualities.

The great bulk of long distance traffic being within limits of 75 miles, it may also be said that the zone in which the maximum profit may be reaped, does not extend very much beyond that limit. This condition, however, differs to a degree, if the system is a large one and extends throughout a densely populated territory where there are no "dead ends"—the end of one line with reference to a town being the beginning of a line with reference to another town.

Toll Line Maintenance.

It is astonishing how many instances may be found where money has been lavished, seemingly without stint, in the building of a toll system having the highest transmission standard and then the endeavor made to operate the property without the most competent men to look after its wire repairs and maintenance. The best and most earnest linemen procurable are helpless without the guiding mind of a resourceful wire chief. Instead of procuring a man for this position who demands a good salary—because he is worth it—in a great many cases, we find a man occupying the position who has little executive ability and but a rudimentary practical knowledge of organization, construction, switchboard and instrument circuit details, and who is not competent to locate faults quickly and accurately by the use of testing equipment.

When we stop to realize the aggregate value of circuit time that slips by per hour because a lead carrying a large number of wires is out of service, we must see that salary should be a small object in keeping us from obtaining the man who can get these lines up the quickest. It is not how much a man's time is worth—it's how much is the task worth. If we put a "seventy-five dollar man" against a "two hundred dollar wire chief's job," the operating company will be the one injured in the transaction.

As it is inconsistent to match a cheap toll operator against a few expensive toll lines, so it is even more inconsistent to match an incompetent wire chief against all the toll lines in the system radiating from his office.

There are very few systems constructed with a proper appreciation of the conditions that should exist to enable a wire chief to locate faults expeditiously. One of the conditions necessary to accurately locate faults is that the line should be a pure loop. There are, however, very few systems to be found in this country where there are not bridging signals connected along the line without being provided with condensers in series to render the bridge circuit opaque to the wire chief's testing currents. Perhaps, some one will say he can locate faults, notwithstanding these adverse conditions. His locations, however, are more of a guess than calculated deductions. If there is a second fault on such a line, it is impossible to discern it and it most certainly will vitiate the test. Introducing a condenser in series with a line signal reduces its impedance, but this effect is slight. It may be more than overcome by using higher resistance windings or by the inclusion of an impedance coil in series with the signal and condenser.

Too little importance is usually given to having the means for cutting and patching lines by operators or other attendants; and too few places are provided, out on the lines, where linemen can open them quickly for tests. Where pole tests are provided for, the commercial types of test connectors are so crude that it takes an unreasonably long time to accomplish the operation. Due to loose connections from these, a set prejudice has developed that, however, will doubtless be overcome when a practical connector—one which can't be put out of business even with a pair of eight-inch pliers—is offered.

Through the variation of temperature we ordinarily experience, the resistance of a toll line may change as much and more than 20 per cent., which would mean 20 miles in one hundred miles of line. However, we find very few instances where the wire chiefs make any attempt, or for that matter know how to go about it, to take *average distributed* temperature into account in a practical manner, though he may have a thermometer hanging on the outer window casing, which he uses at times. As an instance, No. 10 B.&S.G. copper wire has a resistance of 4.859 ohms per mile, single, at 32 deg. Fahr., and a resistance of 5.375 ohms at 77 deg. Fahr., a rise of 10.62 per cent. through 45 degs. Fahr.

Almost any wire chief will take great personal satisfaction in telling you how close he came in locating certain cases of trouble in aerial lines and in cables. But it is difficult to work upon his conscience to the point of inducing him to confess freely of the many times he has had something "throw him off;" and, as a consequence of which, the line stayed out longer than it should, while the faithful repair-man with a two-man-load on his back trudged, sore-footed, miles through the snow on the quest.

It is quite common to see the wire chief "split hairs" in taking bridge readings, to two and three decimal places and then fail to take other really important factors into account at all—much less make a check test to assure himself there is no second fault on the line under test that would make the calculated location inaccurate. Perhaps the wire chief himself is not to be blamed as much as the man higher up who should understand and recognize the conditions so thoroughly that he can outline these methods himself. Nothing bearing upon the current maintenance, operation or earnings of the system, is more vital.

If a line is out a number of hours, it is usually taken philosophically by the man higher up as one of the things to be expected in the business. The loss incurred through incompetent help or by help improperly provided with testing equipment, is given no share of the criticism. There are few station men who cannot acquire a knowledge of testing with a Wheatstone bridge, so that they can locate trouble with a fair degree of accuracy, when they are cut off from the nearest wire chief. Instead of providing these men with cheap testing equipment that may earn its cost in one day, when used under such circumstances, they are usually left to their own devices to locate the trouble by ringing on the line with the generator of a portable telephone set, if the trouble be in the nature of a short circuit, and, if the trouble be of some other nature, to start down the line on a blind search.

A thoroughly competent wire chief will so instill confidence and dependence in his repairmen, that they will manifest more zeal when out on repair missions. Nothing so depresses a repairman as to tramp all day through bad weather on a "wild goose chase."

The same plant operator or general manager who will pace the floor of the wire chief's dingy quarters, wringing his hands and perhaps censuring himself for the fancied sins which caused the visitation of the Almighty upon his lines, will also throw up his hands in holy horror if the wire chief suggests the purchase of testing equipment that would improve the effectiveness and efficiency of himself and his linemen in re-establishing service. The same effect would doubtless be produced upon our disconcerted one by the suggestion to purchase up-to-date vehicles for going out on repair missions. "Why, we can't afford such an outlay now!" The wire chief has a very good idea why, but discretely thinks it to himself.

A practice, seldom followed by toll companies, is to have the wire chief make a most complete trip over his territory to enable him to obtain an exact knowledge of all conditions. He would then know what repairmen have to contend with in all districts. He would then be better able to draw conclusions as to the nature and cause of trouble and how long it will take to re-establish service. A vivid imagination is a qualification of a successful wire chief. He cannot develop this to its fullest possibilities, unless he can form an accurate mind picture of the system in the minutest details—even having a personal acquaintanceship with his repairmen and with those with whom he has occasion to test.

(To be Continued)

Eastern Pennsylvania Independent Association.

The sixth quarterly convention of the Eastern Pennsylvania Independent Telephone Association will be held at Reading, Pa., on the afternoon of November 5 and on Friday, November 6. The headquarters will be at the American Hotel. The convention will convene at 10:00 a. m., Friday, November 6, in the Masonic Temple Building.

This is the first convention held by the association in the territory of the Consolidated Telephone Co., and a full attendance is urged. A special social affair has been arranged for the afternoon and evening of November 5.

The following resolution presented at the convention held at Columbia, Pa., on July 29, will come up for final action:

Resolved: That Section 7 of the constitution and by-laws be changed to read as follows:

"Meetings shall be held semi-annually, the day and place to be set at previous meetings, or by the executive committee. The first semi-annaul meeting in each year shall be the regular annual meeting, unless otherwise arranged by the executive committee, and special meetings shall be held at times and places as the executive committee may from time to time direct. The call for any such meetings shall set forth the time, location and objects of said meetings."

The "Movies" as Publicity Medium.

At a buffet luncheon of the Pittsburgh Builders' Exchange held recently at Pittsburgh, Pa., an illustrated talk, "The Telephone Girl," was given by C. H. Lehman, district manager of the Central District Telephone Co., of Pittsburgh. Moving pictures and other views were also given of the operations of the company's big plant.

Passing October

Another Local Issue—Seeing America First

By J. C. Kelsey

It sounds familiar, but it has been clearly demonstrated—and it cannot be overstated. The tariff is a local issue!

So said General Hancock who made the losing fight for the presidency in 1880. His comment on the great American issue at that time was received with great jeers, for at that time the country was run for the benefit of the Atlantic seaboard states.

As has been the case with all well-known prophets, General Hancock was ahead of his time.

Today, we have other states than the original 13, with other interests. We have had to learn that tariff matters are purely a local issue.

As the world went on, the telephone business was born. It was born, not so much of few days as being full of trouble. After the great wave of competition began, the telephone business came face to face with a great battle of issues. Upon the outcome of these issues depended the very existence of Independent telephony.

A group of financial men had conceived the idea that the telephone was a general issue; that it was a natural monopoly, universal, interdependent and intercommunicating and controlled by a few selected spirits.

It is now admitted, without debate, that telephony is more or less a local issue, not a general one. We know that there exists countless places which can better served by strong local interests. And that the expense of a general system cannot be prorated upon the smaller community without protest. Further, we know that no two known telephone men can exactly agree on any specific doctrine applying to our business.

We have had two national associations before—simply because men disagreed upon small issues, which really appear ridiculous to the outer world. Yet we take them seriously enough.

A few years ago, we were taught that prosperity was a general issue; that no community could be prosperous as long as there was a single locality under the spell of depression. We were taught that a vote for McKinley would mean universal prosperity, and full dinner pails for all, regardless of fitness.

Today, we know that prosperity, as well as adversity, is a local issue, that we have grown so large that nothing less than a judgment day can affect all alike. We know, too, that it is impossible by any legal or legislative act to make every member of every locality prosperous.

No two men can fully agree on every remedy, such as increased railway rates, Panama tolls, merchant marine, currency acts, tariff, war with Mexico and so on. It is a hopeless task, not only to bring prosperity to all, but even to agree on a plan of general welfare.

In the eastern part of our country, 50 clearing houses show losses, while in the Middle West 60 show distinct gains.

The Santa Fe Railroad for September showed a gross revenue gain of nearly $900,000, and in spite of all the clamor of railway ruin, the company saved over $600,000, showing a cost of operation percentage of 33½ per cent. Yet we find other roads sorrowfully pleading for help, and showing great losses.

Things are not permanently bad anywhere. In June the United Boxboard Co., a trust devoted to boxboard products, earned about $1,000 net. Germany was supplying England with these products, really making them, or at least laying down its products cheaper than the American company could do it.

In September, Boxboard showed $15,000 profits—simply because Germany was shut off from English trade. Today, Boxboard has a monopoly on the box products business. This shows us that no general rule can apply to any branch of human endeavor.

A Kansas man went to New York this fall to buy a stock of dry goods for the coming season. He and his partners had had the most profitable year of their business lives, and they saw no reason why 1915 should be any different.

So the senior partner took the afternoon train for Kansas City. He had $15,000 to his credit. He did not even dream that times were hard. His daily paper had little or nothing to say about depression, because there was no local depression to talk about.

He was going to New York to spend his entire appropriation for goods, and peace brooded over him as the clicking wheels carried him onward.

He noticed that Kansas City was as lively as ever. He bought nothing there because his customers wear just as good a quality of clothing as city people do.

In Chicago he observed that everyone seemed fairly happy. There seemed to be as many automobiles on Michigan avenue as ever before. Surely automobiles should indicate prosperity.

He heard some vague rumors of hard times, but not enough to convince him to curtail his purchases. He was only amused when a Chicago friend of his pointed out that times must be hard because his salary of $700 monthly had been cut 10 per cent.

When he reached New York he heard strange and disquieting noises. He heard strange remarks, and he read strange editorials. Everything he read was about factories closing down—that men were being laid off by millions—yet he knew that a Wisconsin knitting mill, where he bought goods, had orders enough to keep it working night and day for one year.

It seemed as if he had come into a world where the bells were out of tune.

Still the Kansas man suspected nothing. Joyously he sought his dealers, there to make them glad with his biggest order—surely, a pleasing thing to the New York firm. But he did not get a smile. He received only looks of pity. Surely, he had heard that the world had stopped its rotations, that the moon and the sun stood still over in the valley.

From every officer and clerk, the Kansas man heard that the country was on the toboggan slide—that any man was foolish to part with real money for dry goods. Why not rent a safety deposit box and put that $15,000 away before the hard time goblins grabbed it?

The mystified Kansas man could not understand fully, so he excused himself for a time. He went back to the hotel and called his partners on the long distance telephone. He surprised them by telling them that there were

hard times; that business was bad and, while it had been good for them, it was only an accident.

So the surprised partners, true to human nature, told him, if hard times really existed, to buy but $5,000 worth of goods. If they needed more, they could buy the rest of the $15,000 order in Chicago as they needed it.

Thus it was that the New York house talked itself into a loss of 66⅔ per cent. of its possible gross business. Thus it is that New York generally is talking itself out of its normal business. Thus it is that New York is paying the penalty of its provincialism.

Times are hard in New York, therefore they must be everywhere. How can any business be prosperous anywhere in the world, as long as the Stock Exchange is closed? How can the sun shine anywhere, when it is so dark in Wall and Nassau streets?

Thus it was that the Kansas man was frightened into cutting down his order.

New York judges the world by the price of stocks, and their rapid transfer. Many other American people have fallen into the error of judging the time by the activities of a common gambler. If stock gambling is active, New York bids the rest of the world to smile.

Its restaurant keepers smile, and the waiters can hardly wait to hurry back home to buy a big estate with their tips. Its theaters rejoice in the sale of seats and high priced boxes, and the world is told that prosperity is again seeking man.

If stock gambling stops, New York tells us to put on sack cloth and ashes—to smile no more.

Its myriads of clerks, losing a little money in some bear raid, naturally feel blue. The New Yorker advises his Kansas friend to go slow, thinking foolishly that some reason exists why his petty loss on some stock should affect the Kanas dry goods merchant. Missionaries of commercial training have a good field in the great city of white lights.

New York imagines herself in dire straits. If you would give your imagination any sort of play at all, you have reason to believe that New York millionaires are walking the streets actually soliciting alms.

So terrible are the conditions that a seat on the New York Stock Exchange sold for the pitiful sum of $34,000. Does this indicate starvation? Do you know of any seat in your locality, every bit as useful as a Stock Exchange seat today, that would bring $34,000 or even $100?

Back in 1899, one of these seats sold for $29,500 and everyone felt that it was being given away. Today, someone, with the throes of a purely psychological depression at its height, digs up $34,000 for the same seat.

That surely shows that someone sees reasonable hope of returning activity. It proves that the sun must shine somewhere on that peculiar minded locality.

The Kansas man had $15,000 which had been earned. He wanted to spend it so that he could earn money to buy stock the following year. Kansas, and of course the Middle West, has enriched itself because it has saved its real earnings.

It can save real earnings because its unproductive expense is very low—and it has real earnings. New York can save no earnings, because its great army of unproductives, as well as drones, eats up the profits which might have been earned. In other words, the productive part of the United States has real money, while such places as New York are really and truly bankrupt.

To illustrate this speculative fever, I have in mind the organizer of a large New York engineering company. Along in 1902 to 1905, any enterprise could be financed—and real money put up.

In 1906 the business of this engineering company was at its height. Money was coming in so swift that it could hardly be counted.

On Christmas morning the head of this company sallied forth with his pockets full of $5 gold pieces. He gave one of these coins to every man who served him. Yet the panic of 1907 caught him, because he had never been able to see that the money which came in so fast, was his own capital money.

He had been spending the principal, and thought all along that it was profit. There can be no profit in New York, because of the terrible expense. He knows that now.

The Claflin failure is typical of this mental and financial condition of our great city. This company was a marvel of success to every observer, yet $42,000,000 was sacrificed in a few years. There had been no profits.

It reminds one of the rat caught in the steel sewer pipe He tried to gnaw his way out, and was greatly encouraged at the chips which fell while he worked. The chips were his own teeth—you know the rest.

The object of this story is really to develop a lesson to the Independent telephone man. We have long had financial ambitions in New York.

How good it looked to be able to swing great financial deals? But could we have paid the price? Could our business stand the drain of unproductive expense, which we now know little or nothing about? That is why it costs you so much less to operate your telephones.

Independent telephone men don't know New York. Our economic position, so long unknown to us, mysteriously kept us away from its seductive paths. We were better off than we knew. We were spared many bitter experiences.

Now we know that some greater power had a hand in it. We were forced to stay at home to save railroad fare, and brokers' commissions, hotel expenses and hat boy tips. Any one of these items will make your general office expense jump one dollar per telephone.

It is a case of "Seeing America First." It does not mean that we should go galloping madly all over America.

It means, for one thing, that the country has realized the folly of spending $300,000,000 in Europe every year. Suppose this money had been diverted to American railroads and American hotels. You would never have heard a sound of railway distress. Suppose the money had been saved and invested. It would have made every industry hum with the greatest energy.

"Seeing America First," really means that we should begin to do things for the home place. The currency bill really means that we should begin to finance home enterprises and industries and quit sending the money to reserve centers for speculation purposes.

Speculation would not be so bad, were it not for the kitty. Do you know what a kitty is? It is the most important adjunct of a gambling house—the cash box under the gambling table. If the players gamble long enough, the commission earnings of the kitty will absorb every dollar involved in the game.

All the years that local money has poured its way into speculative centers, have been wasted. The profits of

gambling have never risen above the demands of the kitty. That ruthless mistress has bankrupted the games. That is why we should rejoice in our luck.

We know we are a local issue, and that our money is not used in gambling. It has all gone into the plant, dollar for dollar.

See America first! Sensible idea. See your home town first—most sensible. Buy everything possible from your home town merchants. Devote your energies toward the strengthening of your own friends, and your strength will follow as a matter of course.

The whole world is sick of sending off or of going away. The people want to stay at home. All the years of sending off and going away have been wasted. The good it has done, has never risen above the demands of the kitty.

How foolish it is to generalize anyway. How silly it is to think that things are better farther on, or that your neighbor is more fortunate than yourself, or that your neighbor is suffering because you are.

The world's idols have fallen. They have failed to deliver the goods. Our old fashioned home gods are back on the job, and the present generation had better heed them, if they would avoid bankruptcy.

The home gods told the Kansas man to purchase $15,000 worth of goods. The world's idols frightened him into a contraction of his orders. Foolish, wasn't it?

MORAL: There is no place like home.

Meeting of Texas Independent Association.

A large attendance is expected at the annual meeting of the Texas Independent Telephone Association, to be held at Waco, Texas, on November 5 and 6. The present officers of the association are: President, J. B. Earle, Waco; vice-president, A. J. Combs, Haskell; secretary, W. C. Dillon, Corsicana; treasurer, W. E. McQuown, McKinney. These four officers, with J. C. Casler, of Dallas, and C. A. Shock, of Sherman, constitute the executive board.

A feature of the meeting will be an address by F. C. Bolton, professor of electrical engineering at the Texas Agricultural & Mechanical College, or one of his assistants, in regard to the course in telephony which that college expects to start at an early date.

Boston Plant Men to Meet.

The Boston plant chapter of the Telephone & Telegraph Society of New England will hold a banquet and entertainment at Copley Hall, Boston, on election night, November 3. Election returns will be received by special wire and posted as a feature of the occasion.

The Usableness of Telephone Lines of Power Companies

Report of Sub-Committee on Engineering Data of the A. I. E. E. Contains Comment by Power Companies on Protection of Telephone Lines Operated Near High Tension Leads—Special Report and Test of Georgia Railway & Power Co.

The question of the usableness of telephone lines of companies operating high tension power lines is the subject of a report of the engineering-data sub-committee of the American Institute of Electrical Engineers, presented at the Detroit convention and published in the October proceedings of that organization. The report as a whole, of which the information as to telephone lines constitutes section F, is an analysis of the engineering data received from 25 power companies, operating high tension transmission systems, in answer to a printed list of questions prepared by the high tension transmission committee of the years 1912-1913 and sent by that committee to 105 power companies operating at 25,000 volts and over.

The conclusions drawn from the replies as to the usableness of telephone lines were that, in general, no company can rely on its telephone line when the power line is grounded, and many cannot use their telephones when electrolytic lightning arresters are being charged. The effect of the grounding of the high tension lines is to make it noisy and to cause discharges over arresters and sometimes to make telephone fuses to blow.

Protective Apparatus of Georgia Company.

The following description of the protective apparatus used by the Georgia Railway & Power Co. to shield its telegraph line from disturbances on the high tension transmission line, together with an account of the tests made thereon, was furnished by E. P. Peck, electrical engineer:

The telephone line of the Georgia Railway & Power Co., from Atlanta to Tallulah Falls, a distance of 87 miles, has No. 4 bi-metallic conductors, insulated with single disk, suspension insulators. These insulators have a dry flash-over test of 70,000 volts, but it is the purpose of the company to connect two of them in series on the telephone line at the earliest possible date. The telephone line is strung on the main 110,000-volt tower line, about 10½ feet from the lower power conductor.

The telephone line operates at a voltage to ground of approximately 5,300 volts, when no drainage coils are connected. The voltage from line to line is very low, except in cases of insulation troubles on the main power line or on the telephone line.

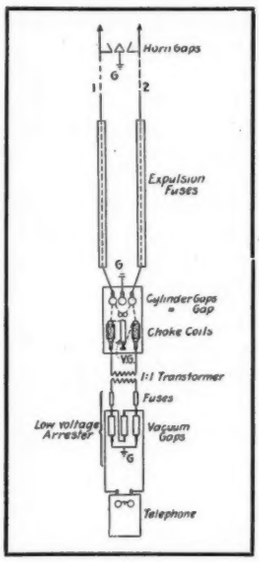
Trouble was experienced, due to the high voltage on the telephone line, and to remedy this, drainage coils have been connected at the Boulevard substation in Atlanta and at the Gainesville substation. A drainage coil will be connected at the power house also, in a short time. A standard 15-kw., 2,200-volt power transformer is used as a drainage coil. The 2,200-volt leads of the transformer are connected to the line wires and the middle tap of the primary is connected to ground, the secondaries being left open.

With the drainage coils connected in Gainesville and in Atlanta, the voltage from the telephone line to ground is approximately 45 volts, the drainage coils carrying a current of approximately 3.75 amperes, continuously, in the ground leg.

The telephones in all of the stations are connected to the telephone line through telephone transformers, insulated for 25,000 volts from primary to secondary.

A number of telephone transformers and telephones have been damaged on this line, the damage resulting from lightning along the line or from leakage either on the main power system or on the telephone line. To stop the telephone and telephone transformer trouble a lightning

arrester has been developed which gives promise of excellent results. The apparatus, a diagram of the connections of which are shown in the accompanying illustration, consists of proper relief gaps which are protected by expulsion fuses. The most important part of this arrester unit is a vacuum gap adjusted to break down at approximately 350 volts and connected from line to line. Adjustable cylinder gaps are connected from each line to ground and other cylinder gaps are connected in parallel with the vacuum gap. Choke coils, wound on porcelain cores and with turns very heavily insulated, are connected between the gaps and the telephone.



Circuit Connections.

The action of the arrester in case of high voltage on the telephone line is as follows: A high voltage impulse being impressed on the lines equally, will raise the voltage of the telephone line and telephone transformer to a value sufficient to break down the air gap to ground and will not impress any high voltage across the terminals of the telephone transformer unless the ground gaps are set unequally, in which case the gap with the smallest setting will drain the wire connected to it directly and will drain the wire with the larger gap setting through the vacuum tube arrester.

If the voltage is impressed unequally on the telephone lines, the vacuum gap will spark across, holding the voltage across the terminals of the telephone transformer and the telephone to a safe, low value.

The choke coils are used to retard steep wave front impulses until the arrester gaps will have time to discharge.

It has been found that a continuous discharge through the vacuum gap will melt the solder and compound used to seal the case of the vacuum tube, allowing the vacuum to be destroyed. The cylinder gap connected in parallel with the vacuum gap is for the purpose of holding the line to line voltage as low as possible in case the vacuum gap is destroyed. The lowest advisable setting on these cylinders will give an arcing voltage in the air of approximately 700 volts and the cylinder gap will never come into play unless the vacuum gap has been destroyed.

The expulsion fuses used are of five-ampere capacity and will not blow unless there is a very severe disturbance on the telephone line. The five-ampere fuse was selected because we did not wish to use a fuse large enough to cause burning of the vacuum gap or the cylinder gaps or to use a fuse so small that it would blow on slight disturbances.

A test was made on this lightning arrester by taking 50,000 volts from a power line supplied from a 550-kw. generator, the power line being connected from line to line on the telephone arrester, from each line to ground and both lines in parallel to ground. Eight tests were made on one arrester with this 50,000-volt power supply, with a telephone transformer and telephone connected during the tests.

Tests were also made in the lightning arrester laboratory of the General Electric Co. on oscillation transformers of 200,000 and 500,000 cycles with oscillating circuits adjusted for voltages from 50,000 to 150,000 volts. An arrester unit was connected in parallel and in series with the main sphere gaps and a number of shots were made. After the completion of the tests the telephone transformer and telephone were still in good condition.

A number of small arresters with the same essential arrangement of the arrester parts have been used on telephone lines paralleling 11,000 and 22,000-volt lines around Atlanta. Some of these arresters have seen about two years service.

A large number of severe lightning disturbances have been handled by these arresters and in one case the 22,000-volt power line fell on the telephone line immediately after the lightning stroke. The main wires to the arrester and the ground wires on the arresters at both ends of the lines were burned off and in this case as well as in all other cases no damage has been done to the telephone transformer or to the telephone. In the same territory a very large number of telephone transformers and telephones have been destroyed by lightning although they were protected by the best arrester system which we had been able to obtain from the manufacturers.

In order to test the use of a telephone lightning arrester on lines adjacent to the 110,000 volt power line, one 555-kw., 440-volt, 60-cycle alternator was connected to a 625-kw., 440 to 50,000-volt transformer and the high side of the transformer used on the arrester tests, continues Mr. Peck's report. On these tests the circuit breaker of the transformer bank was set at 1,600 amperes, the normal load on one generator being 625 amperes.

In test No. 1, the horn gaps, shown in the accompanying illustration, were not used. Line No. 1 was connected to one transformer terminal and line No. 2 was connected to the other transformer terminal. The generator was adjusted to give 50,000 volts and the circuit breaker closed, giving 50,000 volts directly on the telephone lightning arrester. On this test the cylinder gaps and the vacuum gap on the main line arced across blowing the main line fuses. Test No. 2 was the same as No. 1.

In test No. 3, lines Nos. 1 and 2 were tied together and connected to one power transformer terminal and the leads marked "ground" were connected to the other transformer terminal. When 50,000 volts was applied the spark gaps arced across, blowing the primary fuses. Test No. 4 was the same as No. 3.

In tests Nos. 5 and 6, line No. 2 was connected to one power transformer terminal, and ground gap connected to the other power transformer terminal. The application of 50,000 volts resulted in blowing the primary fuses.

In tests Nos. 7 and 8, line No. 1 was connected to one power transformer terminal and the ground gap connected to the other power transformer terminal. The application of 50,000 volts resulted in blowing the primary fuses.

After each of the foregoing tests the 1 to 1 transformer and the telephone bell were tested and found OK. The vacuum gap connected to the high side of the 1 to 1 transformer broke down at 360 volts before the high voltage tests were made and broke down at 370 volts after tests were made.

It is of interest to note, continues the report, that the arrester on the low side of the telephone transformer never had its fuses blown, showing that all high voltage strains were relieved before they reached the telephone transformer.

The report adds that the test corresponds very closely to the condition which will obtain when one of the 110,000-volt power lines crosses with either or both of the telephone lines. In this case the voltage will be 63,500 volts, while the voltage on the tests was 50,000. However, in service, 63,500 volts can never reach the telephone lightning arrester because the insulators on the telephone line will arc across at much lower voltage than this.

Reports from Other Companies.

Noteworthy comments were made by other companies as follows:

The Great Western Power Co., of California, reported that

the most severe trouble was from a ground on the 100,000-volt line. This in general will cause a break over the insulation of the telephone line which is carried on 6,600-volt porcelain insulators. To quiet the line 2-kw. 2,200/220 volt transformers used as drainage coils with the secondaries open, were installed and these were successful.

The Yadkin River Power Co., of North Carolina, reported that the telephone line was said to be usable at all times and the grounding of the transmission line to have no effect. This line is from 500 feet to one mile away from the power line.

The Southern Sierras Power Co., of the southern part of California, reported the telephone line not always usable. Most of the trouble is due to mechanical faults occurring in the telephone lines. Induction is also noticed. Arcing on the horns of out-of-door switches is quite noticeable on telephone lines. A ground on the transmission line makes the telephone very noisy.

The Pennsylvania Water & Power Co., of Maryland, stated that the users of the telephones were protected by lightning arresters and fuses on the line side of the instruments. Insulating transformers are used at the Baltimore end of the telephone line. The telephone is usable practically at all times during operation, the only time when it is not usable being at the time of a ground on the transmission line or during the charging of electrolytic arresters. Troubles on the transmission line blow fuses or burn the arresters on the telephone line occasionally and sometimes burn out the telephones. There has not been much trouble and talking is remarkably good—equally as good as on the Bell long distance lines.

The Niagara, Lockport & Ontario Power Co. reported that heavy induction by grounds on the power lines sometimes blows the fuses on telephone lines at stations. The telephone is practically always usable, due to bleeding coils.

The lighting department of the city of Seattle, Wash., reported that induced currents have caused telephone wires spaced 12 ins. apart to wrap together. Line disturbances sometimes blow telephone fuses (¼ ampere). No attempt is made to use the telephones when a disturbance is on the line.

Public Relations of Utilities in Theory and Practice

"The Public be Benefited!—Presuade the Public It is Being Benefited"—Inequalities of Telephone Rates—Unfair for Commissions to Quote Rates Resulting from the Financial Defect of a Company in Competition, in Disparagement of Other Rates

By Public Relations Engineer

During the earlier part of the week in which these lines were written, I met a man who complained bitterly about certain alleged inequalities in the rates charged for telephone service. He referred particularly to a recent advertisement of the American Telephone & Telegraph Co., which, in effect, says that the telephone "to be of the greatest usefulness, the rates must be so graded that every person may have the kind of service he requires, at a rate he can easily afford." He also complained about certain inequalities, which are the result of intense competition between two rival companies occupying the same locality.

This man's complaint reminded me of a conversation some time ago, with a man who has been chairman of a state railroad commission. This ex-commissioner said:

Before I was put upon the railroad commission of my state, I was as confident as it was possible for me to be, that the making of rates was as simple as the making of a multiplication table. I was as confident as could be that one could easily find out the exact cost of hauling a ton of freight one mile and the exact cost of hauling a passenger one mile. With these two figures to start with, I was as confident as could be that the rest of the technical work of rate making could be completed by any grammar school pupil who had a good standing in the study of arithmetic. But, after having served for many years on the commission, and after having resigned so that I am now as free as possible from those constraints which my former official position placed upon me, I am now confident that no word has as yet been spoken to indicate a scientific scheme for rate making. The longer I continued in the office of commissioner, the more elements I found in actual existence affecting this problem of rate making. The longer I continued as a commissioner, the more I became convinced that rate making was not a matter of science like arithmetic, but a matter of expediency like dealing with late frosts in the spring and early frosts in the fall. I became convinced of the fact that it is impossible to charge more than the traffic will bear; that if you charge the same rate for hauling slack coal as is charged for hauling nut coal, or the same rate for hauling nut coal as is charged for hauling lump coal, or the same rate for hauling coal as is charged for hauling satins and jewelry—you would establish an almost fatal interference with the progress of civilization.

While I believe it is not expedient to charge for the transportation of every commodity all that the traffic will bear, I am thoroughly convinced, on the other hand, that there is no other method known to man, as yet, for fixing the rate which must be charged for many commodities. By this I mean that no commodity can be moved as an article of commerce, if the rate is greater than the traffic will bear. As an instance of what I mean, the commission is constantly confronted with the questions: "How far can hay be shipped, and pay the lowest rate that even the dictates of expediency will permit for its transportation? How far can wood be carried by the railroads, and pay out, at the lowest rate that expedience will permit?"

As I understand it, the policy that this ex-railroad commissioner had in mind was very much the same policy of expediency as that which has caused a higher flat rate for business than for residence telephone service.

Furthermore it seems to me that it is necessary for the man who is defending the interests of a utility—more especially the man who is defending the interests of a telephone business—to be prepared, not merely with ideas but with simple and convincing words with which to set forth the fact that a horizontal flat rate would be an injury to the public.

It is necessary, I think, for the man who defends a telephone business to have at his tongue's end the words that are best suited to persuade his people, that, while he may not be able to justify his rate making by any mathematically accurate process, it is justified by the test of time; that it is justified by the fact that his locality is enjoying a larger use of the telephone, for a given cost, than could be enjoyed by enslaving it to a rate scheme that would necessitate the demands of mathematical exactness or scientific precision.

There is another element which affects rates—another element to be considered in connection with the complaint just mentioned. For the encouragement of peace and good will rather than antagonism and ill will, the principle will be dealt with as it is illustrated in the concrete case of the railroads.

The railroads are asking the Interstate Commerce Commission, at this time, for permission to make rates to the Pacific Coast that will meet the competition which has been created by the opening of the Panama Canal. Shippers are finding it profitable to route certain consignments from Chicago to the Pacific Coast by way of the Atlantic Seaboard and the Panama Canal. Such commodities as fruit and lumber move eastward in large quantities from the Pacific Coast to the Mississippi Valley and beyond. Unless a sufficient quantity

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of counter-balancing traffic can be secured for movement west, the railroads must suffer a loss resulting from having to haul empty cars westward in large numbers.

But the rate for the transportation of the heaviest of the westbound products is now being reduced by competitive water transportation through the canal, and if the railroads are compelled to return empty (to the Pacific Coast), th se cars which are used for bringing lumber and fruit eastward—will not that condition compel a general advance in the rates charged for the transportation of such commodities as are carried by rail?

One railroad man has stated that it surely cannot make a great amount of difference to the shipper who lives in Spokane, whether the commodity which his competitor sells in Portland is hauled to Portland by water or by rail, except that if it goes by water, as it surely will, it will have a tendency to compel the raising of the rail rates which the Spokane shipper must pay. But if the Spokane shipper will consent to railroad competing with the canal, in the hauling of such commodities as it might see fit to move as ballast in its otherwise empty westbound cars, he might by so doing avoid the increasing of the cost of his own transportation.

I suppose some one will suggest that these railroad conditions are wholly foreign to the experiences of telephone managers. It must be admitted that the long and short haul clause and the elements of empty returning cars are foreign to the telephone man's experience. But many telephone men have had, and some are still having, active competition.

Recently, I saw the statement that there are in the United States 1,264 cities, towns and villages in which Independent companies are competing with Independent companies, to say nothing of 630 cities, towns and villages in which Independents are competing with the Bell. I also know of places where two Independent toll lines extend all the way from one wholesaling center to another, as well as Independent and Bell toll lines paralleling each other. These points are mentioned, as was mentioned the so-called intermountain rate difficulty of the railroads, in the hope of dealing with the principle involved and at the same time avoiding personalities.

The fact is that competition still exists, in certain instances. The further fact is that competition, when it has fullest sway, means rate cutting. Concerning this point Franklin K. Lane, when a member of the Interstate Commerce Commission, said: "Competition may compel a reduction in price, but not a like reduction to every one."

I am not saying that competition is a bad thing. In fact, I believe that we have potential competition in the telephone field—always. So far as I have been able to observe, competition springs up in every locality where the management of a telephone exchange fails to appreciate the fact that potential competition is always in existence.

In this connection, it seems to the author that utility men should endeavor to make as plain as possible to the commissioners—and more especially to the public—that insofar as the lower rates, under competitive conditions, have brought about the financial defeat of one or both of the competitors, to that extent it is unfair to quote such competitive rates in contrast to or in disparagement of other rates.

During at least one-half of the period of my management of telephone companies, I made the mistake of feeling called upon to justify or argue away the apparent discrepancy between the rates which we charged in towns where we had no competition and the rates which we charged in towns where we had active competition.

With one other man as a partner, I was personally responsible for the ownership as well as the management of exchanges in three towns ranging from 1,000 to 2,000 inhabitants. In one of these towns, there had never been any threat or suspicion of active competition. In the second town, a farmers' mutual company had endeavored to start active competition but it had not succeeded in its endeavor. In the third town, a farmers' mutual plant, backed by farmers whose financial statements would have enabled them to borrow a half million dollars at the banks, was built. It was dedicated to the idea and the promise that residences should have telephone service in town at not to exceed $6 a year, and business houses at not to exceed $9 a year, with a probability that the cost would be much less.

As a matter of fact, we continued the operation of these three exchanges until we finally sold them to the competing farmers' mutual at a price which netted us, in a small way, of course, a very handsome ratio of profit. But, the principal reason for the gaining of this profit, and the principal reason for avoiding total loss, was the fact that *we met the cut rates* of the farmers' mutual company in the one town without making a corresponding cut in rates which we had always charged in the other two towns.

If we had been compelled to reduce the rates in the two non-competitive towns to the same "kill or be killed" basis that we charged in the third town, we would have been utterly ruined, financially—so far as the company which operated these three exchanges was concerned.

The point I wish to make is this: The apparent unjustifiable discrepancy in rates, which invariably grows out of "kill or be killed" competition, is unavoidable. The unjustifiableness of the case is in the original cause and not in the indefensible rates—the rates are an unavoidable result.

The real cause is to be found in the fact that some man, or group of men with more money than experience in the telephone field, undertook to sell service in a particular locality at less than its actual cost. And the men or group of men who previously occupied that field had to choose between the policy of killing off their competitor, being killed off by him, buying him out, or selling out to him.

As a rule it is impossible for the original company to sell out, for the reason that the new rival almost invariably underestimates the cost of the plant he proposes to build according to the same general tendency to error which leads him to believe that service can be supplied for one-half of what it actually costs. Therefore, as a rule, competition between two Independent companies usually means for each a choice between killing or being killed. And, so far as this "kill or be killed" condition prevails, to that extent it is useless to plead for consistency as regards rates, service, or anything else. It is useless to expect a suffering man to be consistent. It is equally futile to demand consistency in the matter of rates, or service, in that locality where two or more utilities are in a death struggle.

In connection with the railroads, this was recognized years ago. In his book on the railroad problem, the former president of the Great Western Railway, A. B. Stickney, very clearly set forth the fact that there could be no escape from the former cut-throat rate practices of the railroads until the government took the matter of rate making into its hands. That is why the railroads and other utilities are forced—against their natural inclination—to an increasing appreciation of regulation. In my opinion, regulation strengthens the potential elements in utility competition and relieves the more desperate elements of the "kill or be killed" kind of competition.

Meeting of Telephone Society of Pittsburgh.

About 600 persons attended the meeting held recently at Pittsburgh, Pa., by the Telephone Society of Pittsburgh. W. W. Henderson, district commercial superintendent of the Bell Telephone Co., of Pennsylvania, presided, and L. H. Kinnard, of Philadelphia, vice-president and general manager of the company, spoke on "The Patriotism of Service." Addresses were made by P. C. Staples, publicity manager; J. H. Hons, auditor; C. E. Malley, auditor of receipts, and F. I. Daly, assistant treasurer and other officials.

Proceedings Before Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision of Telephone Companies, Decisions of Courts in Matters Affecting Public Relations of Utilities and Actions of City Councils Bearing Upon Franchises, Rates and Service

The Telephone and Telegraph War Tax.

As forecasted in last week's issue of TELEPHONY the war revenue bill has become a law, the signature of the president having been affixed after TELEPHONY had gone to press. The only change in the section of the law relating to the tax on telephone and telegraph messages as published last week, was that the bill as finally enacted states that the telephone company shall collect from the "person paying for" the message or conversation, instead of the "sender of the message or originator of the conversation," as it formerly was.

The initial statements required in connection with the tax to be collected by telephone companies throughout the country must be submitted to the collector of internal revenue of the respective districts on or before February 1, 1915. The various statements will be of great interest to telephone men, as it is required that they embrace the number of dispatches, messages, or conversations for which a charge of 15 cents or over has been made, and the extent of the toll business of the various companies will be considerably revealed. It is believed in the East that the Independent companies will make a bigger showing in toll business than the Bell system.

The opinion is held in the East that as the war tax bill passed Congress it was eminently fair. To have placed the burden of the tax on telephone companies would have been a hardship of some magnitude, while the tax upon individual senders, or the person who pays the bill, will not be felt. That this opinion was generally held by the legislators at Washington was evidenced by the lack of opposition to the changes as proposed by representatives of the National Independent Telephone Association and of certain telephone companies who went to Washington. These changes were to the effect that the tax be paid by the sender instead of the company itself as provided in the original house bill. The amendment as desired was made by the finance committee of the senate, reported and passed by the senate, and finally approved without opposition by the house.

It is unofficially estimated that the tax on telephones will yield from $900,000 to $1,500,000. According to the new law that section which provides a tax on telephone and telegraph companies goes into effect on December 1. Within 30 days after the expiration of the month, the companies must turn over the money collected and with it a statement as described above.

The method of collection has not been stipulated. It is believed, however, that the companies will not find the collection difficult, although the statements required will cause some additional work.

Telegraph company officials state that they believe the tax, so far as telegrams are concerned, can be collected without much added expense. It is believed that soon after the expiration of each month the companies will be able to file their statements, as the work of collection on telegrams will be greatly facilitated because of the fact that the majority of telegraph messages are paid for in cash by the sender immediately. However, the exact methods of collection have not been decided upon, and the companies are waiting for directions from the internal tax collector.

In transmitting to members of the National Independent Telephone Association extracts from the bill, Secretary F. B. MacKinnon writes as follows from Association headquarters, 527 Colorado Building, Washington, D. C.:

Doubtless you will receive notice from the collector of internal revenue of your district, instructing you as to methods of making the reports, remittances, etc., and also covering the reporting of reversed messages. You will notice that collection is to be made from the "person paying for the message," which covers the case of reversed messages.

I want to take this opportunity of thanking you for your aid and co-operation in securing the amendments to this section so that the law now stands that the subscriber, instead of the telephone company, will pay the tax. If it had not been for the active co-operation of the men in the Independent business, there is no doubt but that this section would have remained as it was passed by the house and the Independent companies of the country would have had to pay a war tax running upwards of a million dollars.

While the making of these reports is going to be somewhat of a burden, as will also the collection of the tax, yet in a general way it is going to be of great benefit to the industry, by demonstrating to what extent toll lines are used and the number of millions of messages that are handled by Independent companies.

If, after you receive your instructions from the collector of internal revenue, there are any points about which you are doubtful and you will let me know, I shall be glad to take them up with the commissioner of revenue here.

California to Vote on Extension of Commission Power.

A proposition to invest in the California Railroad Commission the exclusive power to fix rates of public utilities in incorporated municipalities of the state, which is now in the hands of the local governing bodies, will be voted upon by the people of the state at the general election on November 3.

Utilities Commission for Wyoming Probable.

That Wyoming will become one of the states which undertake the regulation of public utilities through a state commission is forecast by the platforms of the Republican, Progressive and Democratic parties, all of which pledge their candidates for the legislature to the enactment of a public utilities commission law. Several efforts to get a public utilities commission law through the Wyoming legislature have failed.

The Merger Issue in Michigan.

A recent appeal by certain Independent telephone companies of Michigan to the federal department of justice as to the legality of recent telephone mergers in Michigan, is reported to have resulted in a hearing or conference at Washington, D. C., at which both the Independent companies and the Michigan Railroad Commission and state were represented. Attorney General Fellows, of Michigan, called on the department of justice when in Washington, recently, and then wired for Chairman Lawton T. Hemans, of the Michigan Commission, in order that that body might have representation at a conference.

Some months ago Mr. Hemans went to Washington when several proposed mergers of telephone companies were about to take place, in order to determine the attitude of the department of justice and ascertain whether or not they considered telephone mergers pending in the state were deemed a violation of the Sherman anti-trust law. At that time, while the department did not give an opinion, Chairman Hemans was satisfied that it would not

interfere in the matter, and as a result several mergers were authorized by the railroad commission, where telephone companies had made applications, to consolidate their lines.

Objection by Independent interests to the merger trend in Michigan has now apparently brought the matter to a more definite issue.

Proposed Purchase of Pennsylvania Companies.

A stockholders' meeting of the Central District (Bell) Telephone Co., of Pennsylvania, has been called for December 10 at which time it is said the stockholders will be asked to ratify the purchase of the properties of the Burgettstown Farmers Telephone Co., of Burgettstown, Pa., and the Prospect Telephone Co., of Prospect, Pa.

Would Investigate Chicago Automatic Service Further.

Representatives of 16 political organizations, labor unions and women's clubs appeared recently before the city council of Chicago and petitioned that the list of telephones operated by the automatic system, the Illinois Telephone & Telegraph Co., be investigated by a special committee.

It was suggested that two aldermen, a reputable accountant, one representative appointed by woman's organizations and another by the Chicago Federation of Labor, be named as investigators to assist the department of public works.

The object of the proposed investigation is to determine the number of subscribers with telephones in service and working order on September 1, 1911, 1912, 1913 and 1914; those who pay a lower rate than that specified by ordinance; the number who have not signed contracts, but pay the rates specified; those who have not signed contracts and pay a lower rate; the number of non-guaranteed public pay stations; the number of private branch exchange telephones that are paid for at the rate specified and the exchange telephones that pay a lower rate. The petition was referred to the gas, oil and electric light committee.

Further Illinois Rulings As to Mutual Companies.

A telephone company which operates under a franchise granting it the use of the streets, is a public utility, and is subject to the provisions of the public utilities act, even though it bears the name of a mutual company, according to two rulings of the Illinois Public Utilities Commission on October 22. The commission bases its finding on the rule of law that the use of the streets cannot be granted for private purposes.

In the case of the Pike County Telephone Co., of Pittsfield, Ill., vs. H. G. Noble, James Hill, Edward Barry, John Johnson and George Waggoner, the commission restrains the respondents from establishing a telephone exchange at Perry, Ill., without a certificate issued by the commission and the Noble Mutual Telephone Co., of Noble, Ill., is restrained from proceeding with its work on an exchange, in response to objections on the part of the Noble Telephone Co.

Both respondent companies claimed they were extending and uniting farmers' lines already in operation, and that their companies were mutual companies because they served only stockholders. The petitioners for restraining orders, however, contended that they were establishing new exchanges and were serving the general public. Since the reasoning of the commission is much the same in both cases it is necessary to quote only the following from the Pike County case:

> It appears from the records that anyone in the community that will be served by the telephone company that the respondents are organizing, can secure such service by becoming a stockholder in said company. In other words, it appears that such service is open, under the same terms and conditions to all alike; that any member of the public can secure telephone service on the same basis as any subscriber or other person; namely, by becoming a stockholder. It also appears that said telephone company proposes to use not only the highways in the vicinity of Perry, but that it also proposes to use the public streets and alleys of said village for its poles, wires and other appliances under a license or franchise secured from the president and board of trustees of said village authorizing it so to do.
>
> The law seems well settled in this state that a municipality having control of the public streets can only grant easement or right therein for a public use. . . .
>
> It further appears that by the terms of the permit or grant from the village of Perry to use the public streets and alleys therein, the respondents are required to install a telephone exchange in said village and to keep such exchange open for the accommodation of the patrons and public at all reasonable hours.
>
> Under the facts as shown by the record in this case and in view of the law in this state, it is difficult to perceive wherein the telephone company that is being organized by the respondents will not be for public use. . . .
>
> We might concede that the rebuilding of the farmers' lines within the corporate limits by respondents' company would only be an extension of its present facilities, but we cannot argue that the construction and installation of a telephone exchange in the village of Perry under the facts and circumstances in this case is merely an addition to respondents' lines.

Summary of State Commission Hearings and Rulings.

CALIFORNIA.

October 8: Decision in the case of the Guglielmetti Rural Telephone Co. against the Chileno Valley Telephone Co., holding the latter company to be under the jurisdiction of the commission and requiring it to charge the same rate to all subscribers whether stockholders or not. The Chileno company is required to remove its lines from Chapman Lane within 60 days.

October 16: Decision authorizing the Consolidated Securities Co. to sell its telephone system to the San Fernando Telephone & Telegraph Co., of San Fernando, Cal. The company will issue a promissory note of $20,000 at 6 per cent., payable in installments over 20 years and will issue $10,000 of capital stock for extensions and betterments.

November 23: Hearing to be held at San Francisco at which time all telephone companies of the state are requested to appear, if they so desire, and show cause why the deposit clause should not be eliminated from contracts for telephone service.

ILLINOIS.

October 22: Decision in the case of the Pike County Telephone Co., of Pittsfield, Ill., vs. H. G. Noble, James Hill, Edward Barry, John Johnson and George Waggoner, restraining the respondents from establishing a telephone exchange at Perry, Ill., without a certificate duly obtained from the public utilities commission.

October 22: Decision in the case of the Noble Telephone Co., of Noble, Ill., vs. The Mutual Telephone Co., restraining the latter from proceeding with work on an exchange.

October 22: Sale of Macoupin County Telephone Company's telephone exchange at Chesterfield, Ill., to the Chesterfield Telephone & Telegraph Co. approved, and the Chesterfield company authorized to issue its 6 per cent. first mortgage gold bonds in the aggregate amount of $5,500 in payment.

October 22: Menard Telephone & Telegraph Co. given permission to increase its rural rates at Middletown and Greenview, Ill., on a cross petition filed in the complaint brought by E. W. Tilson and W. A. Pond against the company, in which it was claimed that the rates had been increased without authority of the commission. The cross petition asked this authority.

October 22: Commission approved the agreements made by the Central Union Telephone Co., receivers, and the Gillespie Home Telephone Co., of Gillispie, Ill.; Rock River Telephone Co., of Rochelle, Ill.; Orval D. Zook, of Kilbourn, Ill.; A. L. Jones, of the City Telephone Exchange, Barry, Ill.; Meadows Central Telephone Co., and the re-organization committee of the Western Illinois Telephone Co., Macomb, Ill., to operate their lines jointly.

October 22: Elkhart Independent Telephone Co., of Elkhart, Ill., given authority to increase rates.

INDIANA.

October: Hearing on application by the Pike County Tele-

phone Co., of Washington, Ind., for permission to issue $75,000 of 6 per cent. 20-year gold bonds in addition to the $50,000 issue heretofore authorized. The company operates exchanges at Petersburg, Winslow, Otwell and Monroe City in addition to the automatic plant newly installed at Washington, Ind. The Washington plant is represented as an investment of $108,724. The company claims to have orders for 600 more installations in Washington. There are 400 now in operation.

October: Approval of the sale of the Walcott exchange of the Jaspar County Telephone Co., to J. C. Dickson, of Earl Park, Ind.

KANSAS.

September: Complaint by Charley Decker against J. D. Frost, of the Prairie Home Telephone Co., asking that the company be required to furnish service as per agreement and a similar complaint against the same company by J. W. Rundell.

October: Dismissal, on agreement between complainant and respondent, of the complaint filed by C. L. Patton, a physician, against the Center Township Telephone Co., requesting that the company be required to improve its service and maintain night and day service.

October: Application by Anna C. Christensen, administratrix of the Whiting Telephone Co., of Whiting, Kan., for permission to sell the system.

October 16: Dismissal, by agreement between complainant and respondent, of the complaint of poor service and maintenance lodged against the Arlington Telephone Co., of Arlington, Kan., by Ray Bowles.

October 27: Hearing at Topeka, Kan., on request of New Albany Telephone Co. for permission to sell the system.

October 27: Hearing at Topeka, Kan., on petition of the Fall River Telephone Co., of Fall River., Kan., for permission to sell the system.

November 6: Hearing to be held at Girard, Kan., in the complaint by the Girard Telephone Co., of Girard, Kan., against the Farlington Mutual Telephone Co. asking that the respondent be required to fulfill alleged agreements of a contract.

MARYLAND.

October 14: Order granting permission to the Chesapeake & Potomac Telephone Co. to absorb the local telephone company in St. Mary's county, with headquarters at Charlotte Hall.

MICHIGAN.

October 16: Hearing held on complaints from 15 or 20 citizens against the Grand Trunk, Michigan Central, Ann Arbor and Pere Marquette railroads on the question of telephone services in depots. Representatives of the railroads stated that they were not going to refuse such service in general but that in all the cass cited they had valid defenses.

NEBRASKA.

October 13: Hearing on the application of the Maxwell & Brady Telephone Co., of Brady, Mo., for permission to increase its farm line rate from $1 to $1.50, with a special rate of $1.25 if paid six months in advance, and to fix the rate for switching farm lines at $6 per year, or $5, where payment is in advance.

October 23: Rehearing held in the matter of the application of the Lincoln Telephone & Telegraph Co. for authority to cancel grounded circuit rates at the Ashland exchange. The commission had previously given permission to cancel the rates but the patrons made objection and a rehearing was ordered by the commission.

November 4: Hearing to be held at Sargent, Neb., on the application of the Crownover Telephone Co., of Sargent, Neb., for authority to increase its exchange rates.

NEW YORK.

October 8: Dismissal of complaint of Robert L. Eaton, of Linden, N. Y., against the New York Telephone Co., charging discrimination against him in the payment of his telephone bills.

October 26: Order requiring the New York Telephone Co. to cease charging more for rural service in the Valley Falls district than it does in the Jonesville district. The action was taken on complaint of the chamber of commerce of the village of Schaghticoke. It was shown that under similar conditions the company charged $18 for service in Valley Falls and $15 for the same service in the adjacent territory of Jonesville.

OHIO.

October 16: Complaint by the Sixth Avenue Realty Co., of Cincinnati, owner of the Greenwood Building, against the Cincinnati & Suburban Bell Telephone Co. alleging a higher rate for switchboard service than is charged other companies. Complaint is made that a charge of three cents for each outgoing call is made in addition to the regular switchboard charge. The company declares the charge to be in accord with its published tariffs and the same as would apply to other customers with exchanges under similar arrangements on a measured service basis.

October 21: Order authorizing the Farmers Telephone Co., of Bloomville, Ohio, and the Central Union Telephone Co. to retain a physical connection between the systems and interchange service.

October 21: Order authorizing the Tiffin Consolidated Telephone Co., of Tiffin, Seneca County, Ohio, and the Central Union Telephone Co., to retain a physical connection and to interchange service.

OKLAHOMA.

November 10: Independent Telephone Co., of Chester, Okla., cited to appear and answer a sweeping complaint filed by W. E. Condreay and T. W. Steele, of Chester, regarding maintenance and service.

October: Order refusing to compel the Pioneer (Bell) Telephone & Telegraph Co. to grant the Big Pasture Mutual Telephone Co., of Ahpeatone, Okla., free switching privileges through the Pioneer exchange at Walter. The Big Pasture Mutual lines extend between Ahpeatone and Walter, 15 miles apart. The commission declared that the $5 per month fee charged by the Pioneer was not excessive; was the customary fee at other points in the state, and would not be disturbed.

OREGON.

October 16: Order defining the division of rates between the Trendholm Telephone Co., plaintiff, owning a line from Trendholm to St. Helens, Ore., and the St. Helens Telephone Co., of St. Helens, Ore., defendant, where the patrons are not subscribers of either company. After taking into consideration the value of the property of both lines, the commission decided that when the call of a non-subscriber of either line originated on the plaintiff's line the plaintiff should be entitled to 30 per cent. of the charge, and the defendant to 70 per cent., and where a call originated on the defendant's line, it should be entitled to the whole charge.

October 16: Order granting the Pacific Telephone & Telegraph Co. permission to discontinue its station at Lowell, Lane County, Ore.

PENNSYLVANIA.

November 5: Resumption of general hearings at Harrisburg as to the rate basis of the Bell Telephone Co. of Pennsylvania.

WASHINGTON.

October 28: Hearing held at Seattle as to tentative rules proposing to forbid telephone companies to exact deposits at the time of making telephone installations and proposing to permit telephone companies to collect in advance from month to month for local exchange service and to discontinue service 10 days after such charge is payable, and is unpaid.

WISCONSIN.

October: Order in the matter of the investigation by the commission, on its own motion, of the rates and division of tolls on the lines connecting the N. A. Price Telephone Co., at Markesan, Wis., and the Kingston Telephone Co., at Kingston, Wis., suspending the present rates and establishing new rates, under which the subscriber has the option of unlimited service over the line at $2 per year, or may pay 10 cents per message, all messages to be limited to three minutes. The election of the flat rate privilege must be made one year in advance. Each company shall furnish the other with data and lists of patrons. The total revenue derived is to be divided equally between the companies until some other basis is established by agreement between them.

October: Order granting the petition of W. R. Howard & Sons, et al., and directing that the Greenwood Telephone Co., Clark county, provide service between 5 a. m. and 10 p. m., and handle calls of an urgent nature at all other times. The company has 28 patrons.

October: Reaffirmation of commission's original order of February 14, 1914, in the case of the Arena & Ridgeway Telephone Co. vs. Troy & Honey Creek Telephone Co., Dodgeville & Wyoming Telephone Co., West Spring Green line, and Big Hollow Telephone Co., with the exception that the minimum charge to be made to the Spring Green exchange by the Arena & Ridgeway Co. for switching service for its loaded line shall be $25 per year. At present the charge is $1 per subscriber. The original decision in this case was that the owners of the Spring Green exchange, respondents in this case, pay to the Arena & Ridgeway Telephone Co., the sum of $27 per year for the use of the trunk line connecting the Spring Green and Fernan exchanges; and that the Arena & Spring Green company pay to the respondents the sum of $1 per year for switching service for such telephones as are connected to the petitioner's rural lines which enter respondents' Spring Green exchange.

Local Telephone Operating Rules and How Developed

A Serial Story Dealing with Local Operating Terms and Rules—Reasons for Their Use—A Real Study of Rules Beginning with Fundamentals and Developing All Essential Factors in Operating Room Practice, for Both Small and Large Exchanges

By Paul Hamilton

Within a day or two, Carney discovered that Miss Sible was a competent agitator. She had a way of arousing interest without giving any important details or information. When some of those on the list asked for details, she referred them to Mr. Carney. "It was entirely his plan and I thought it was just lovely," she said. She then explained that she personally would be very much disappointed if every manager in the county was not present at the first meeting.

Carney was called by each of the seven other managers. He made known to them his intention insofar as he had developed plans. The two conspirators succeeded in getting the others to agree to join them at one conference, at least. Of course the preparatory work fell upon Carney. In reality the first meeting was to be his personal entertainment, to be developed later into a series of conferences, if possible. He hoped to establish uniformity in Tokin County and to lap over the borders into the adjacent counties, which eventually would be interconnected. To wait until the interchange service became an existent fact, would only make the accomplishment more difficult.

Being satisfied that he could expect but little assistance in the preliminary work in outlining their position, the method proposed and the hoped for results, from any but Miss Sible, he set his ideas in writing and submitted them to her for comment as previously agreed.

It had been his idea to begin at once upon the rules to govern the operators. Miss Sible suggested that they go even further back and formulate some standard practice in courtesy for the guidance of managers. She supported her suggestion by the argument that a great deal of the manager's telephonic communication with subscribers took place in the presence of the operator, or at least she was in a position to overhear such conversations if she so desired.

Mr. Carney accepted the suggestion as suitable for consideration and perhaps timely for action. He decided to place it before the meeting and there have the decision made.

On the appointed day, eight of Tokin County's managers assembled at Princeville. Mr. Carney met them in the little audience room he had arranged, having furnished it with a long table and chairs. Memorandum paper and pencils were also provided.

"I presume," he began, when all were seated, "that until we perfect an organization, it will be my privilege, or duty, to act as chairman. Before we begin definite work, however, it may be advisable to outline, in a general way, the reasons for convening here. You will, perhaps, excuse my persistence in this matter, upon the ground that I have but recently come among you. In experience I am perhaps more familiar with the progress of operating methods than I am with the difficulties encountered in the past, and which we may encounter in the near future, in establishing uniform methods of dealing with our subscribers in this locality.

"It is but recently—I may say within the past few years—that operating has been given its proper place in the organization of telephone utilities. Even in metropolitan exchanges, its place in the past has been secondary to many other branches. Maintenance, especially, has overshadowed it and without just reason. Special studies of maintenance have been made for years while little expert knowledge has been accumulated in the operating branch.

"The first traffic engineers assigned to the operating department were technical men, and for a time they devoted

"The King Can Do No Wrong."

themselves to a study of equipment from the operation side. Prior to that, equipment was designed to accomplish a certain purpose regardless of the lack of economy which might result from its use, or operation.

"Gradually these men found opportunity to take up the problem of formulating rules for the guidance of operators. It was found that more efficient service could be rendered by this method, and upon a more economical basis. Eventually, men thoroughly familiar with every detail of operating, but without technical knowledge, were entrusted with the rule-making problems.

"None of us can afford to employ experts to advise us on our problems. While we cannot adopt rules already laid down for use in other places, we can, by a careful study of our requirements, so modify those adaptable to our work that they will be available for our use. The contrast between our methods and those more thoroughly developed is, perhaps, more striking to me, owing to my having witnessed the effects of the more recent developments in that line.

"I also assume that our individual efforts have accomplished few, if any, of the varied ends desired. Mr. Jackson, Mr. Hussey, Mr. Prince, and Miss Sible, have all acknowledged the task was too great for them. At least they gave up in despair, and tried to be satisfied with local conditions as they found them.

"It is my belief that a united effort may accomplish results where individual effort failed. I think therefore the first matter for us to decide is whether we shall form a permanent organization to undertake the problem of

working out uniform rules, or merely pass a few hours congenially, and continue as we are."

Miss Sible was first to express her opinion.

"I, for one," she began, "am in favor of a permanent organization, even if for no better purpose than sociability. We are quite certain to 'talk shop' and there is no telling how much may be brought out. I take it upon myself to nominate Mr. Carney as president of our association. All in favor say—"

"Wait a minute!" exclaimed Mr. Carney. "I have a word to say. Isn't there a better plan. As chairman, one is liable to fall into the habit of dominating the proceedings. I have no objection to acting as spokesman today, for we are here in Princeville and the place seems to be mine by inheritance or geographical location."

"I was about to second Miss Sible's nomination, but that word 'geographical' has put an idea into my head," spoke up Miss Floyd, of Hardscrabble. "I suggest a plan along this line: Let us first find out how many of us are prepared to entertain our organization. We should not impose upon Mr. Carney all the time; besides, it may be that he would like to travel a little, also. If we decide upon such a plan—that is, a different meeting place each time—then the manager in whose town we meet, might act as chairman for that day. That will give every one a chance but me, as Pine Run can scarcely offer convenient accommodations, even if it were easily accessible."

"I like Miss Floyd's suggestion," said Mr. Carney, "but Miss Sible has the preference in making comment inasmuch as it affects her previous motion."

"I would withdraw my motion, but that is not necessary, since the motion was not seconded. In accord with the suggestion before us, which has my hearty approval, I think we may determine at once who of us can offer the necessary conveniences for our sessions. I would enjoy a day at Pine Run, I'm sure. Perhaps we could hold an open air session there." Be it understood that Hardscrabble and Pine Run refer to the same place, the former being a nick-name in common use.

After some discussion, it was found that sessions could be held at all exchanges except Pine Run and Florida. Mr. Burke explained that Florida was a very pleasant and thriving town, once a person were there, but it resembled a debt, as it was much easier to get in than to get out. They could come there one day, but there would be little chance of getting away until the next. Pine Run was cut out of the list, temporarily only, as Miss Sible insisted upon going there sometime for a conclave.

It was then determined, by lot, where the next meeting should be held, the time being set for "two weeks from today," as Miss Sible wrote, having volunteered to make such notes as were thought necessary, informing her coworkers that she was once proficient in shorthand. The lot fell to Rock Ridge. Mr. Telson stated that he, being unfamiliar with parliamentary procedure, he would observe Mr. Carney very closely.

Just then the whistle at the factory nearby gave forth a blast.

"That reminds me!" exclaimed Mr. Carney. "I arranged for luncheon at 1 o'clock. At that time we can have the dining room pretty much to ourselves. We are now ready, I believe, to proceed with the consideration of the business of rule making, as that was the primary reason for which we came together. Has anyone any suggestions as to a starting point?"

No one present appeared to have an idea clear enough in his mind so that it could be put into words.

"As on one else appears to be prepared to give an opinion, I will suggest we first give consideration to rules for our own guidance."

"It had never occurred to me that any set of rules could be laid down for a manager," Mr. Jackson remarked.

"Well," answered Mr. Carney, "I am not certain that there is, nor am I convinced that nothing can be accomplished along that line. One thing I know, however, and that is that the manager's conduct is continually under the observation of his operators. While perhaps his license is a little broader, it seems to me there are certain conditions under which his manner of address and conversation can be made exemplary. For instance, we will no doubt make a hard and fast rule against the use of the word 'Hello,' by any member of our force. Now why should the manager not conform to such practice, as well? This came to my mind the other day when I called Mr. Prince. His salutation was 'Archer Grove, the manager speaking.'"

"I find it quite desirable to use some form by which the calling party can be advised as to who is talking," said Mr. Prince. "I have had a number of misunderstandings with patrons. They did not know exactly with whom they had conversed and had neglected to become advised in the matter. Afterward, they presumed that they had talked to me."

"Wouldn't it be advisable to use your name instead of the manager?" Mr. Hussey inquired.

"I considered that, but decided it would be better to use 'the manager.' If the name is unfamiliar, it is seldom retained in a patron's memory at the end of the conversation. He will, however, very likely recall that he talked to 'the manager.' The matter is open for discussion, however."

"In my case, I am not the manager," said Miss Floyd.

"You are to all intents and purposes," Miss Sible replied. "My situation is quite similar to yours. As a general rule, I don't think we ought to be considered—not at this time, at least."

"Suppose we go a step further back," said Mr. Jackson. "Can we begin by saying the manager shall comply with the rules governing the general force as far as compatible with his duties or his transactions over the telephones with patrons, or words to that effect?"

"That is supposed to be understood," Mr. Telson remarked.

"Then there should be no objection to its publication," said Mr. Prince.

"Do I understand that the operators are to be advised of such rules as we may make for our own guidance?" Mr. Burke inquired.

"If not, why not?" was Mr. Prince's ready answer.

"It would give them a surveillance over us, would it not?"

"Your attitude is, of course, meaning no offense," said Mr. Carney questioningly replying to Mr. Burke, "the divine right of kings. The king can do no wrong?"

"Not exactly that, but a manager must have wider limits of action than an operator, or in fact any subordinate, even if they are temporarily delegated to perform his duties."

"I think there is no argument on the other side of that question," said Mr. Jackson. "I especially specified that he should comply with the rules for other employes only so far as compatible with his dealings with patrons. The words may not fully express the desired meaning. The idea is to allow him a limitless latitude when the fixed rules do not govern the case."

"It will make a very acceptable preamble, at least," said Mr. Hussey. "Let's get it down to the exact form to express just what we desire."

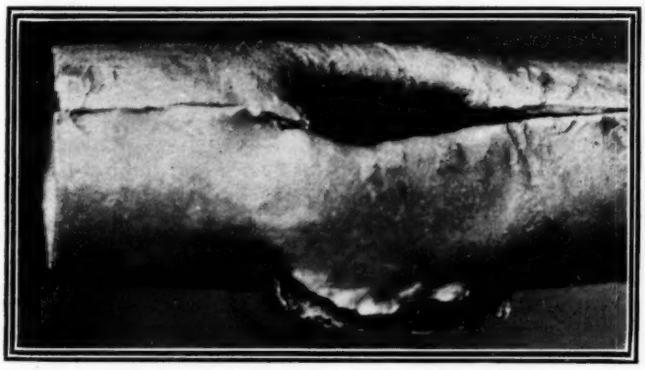
"As it is now 1 o'clock, I will take it upon myself to declare a recess for luncheon," Mr. Carney broke in. "It is not necessary to put the question to you for discussion."

(To be Continued)

Practical Subjects—Letters and Discussions

Cable Damage Due to Ignorance.

The accompanying photograph shows the damage done to a 350-pair cable by a workman not knowing that there were underground cables in this place. The men, while excavating, after removing the pavement, drove a two-inch crowbar through the cable which was laid in fibre conduit, incased



Cable Sheath Damaged by Workman's Crowbar.

in concrete. I would suggest to all companies which have underground cables, that they furnish the city engineer or any companies which have occasion to excavate in the streets occupied by the telephone companies, with blue prints of their underground cable plant.

R. W. Black, Manager,
Hattiesburg, Miss. Mississippi Home Telephone Co.

A Few Lines from a Minnesota Lineman.

Blushed the sky at morn a-crimson,
Casting off her dark robe Nature
Bared her breast to meet the sunshine;
Bared her fair and lovely features
To the rays which always thrilled her,
Caused new life to spring within her.
Bold she threw aside her night robe,
Fresh she sprang all bathed with dew drops
Into view to meet the morning.

Sang the birds, her wards, around her,
Laughed the brooks and danced and gurgled,
Fanned the breeze with loving lightness
Her fair face and stirred her tresses,
And the lake with mirrored bosom
Casting back her every feature
Caught the sky with all its blushing,
Pierced with shooting shaft of silver,
Caught a picture of the morning.

Anyhow, that was the way it looked to us up here in this land of pike, pickerel and prairie chickens as we gathered at the storeroom last Monday morning preparatory to starting out on the little yearly relaxation which we call "Patrolling the Rurals," with a view of putting them in first class shape for the winter that we have every reason to believe will be with us soon. We figure that the job will keep us busy during the month of October and some time in the month of November.

Our lineman helper, a perfect gentleman when not in disguise behind a cigarette, was at the wheel. The car was loaded for anything that might come along, from re-setting a pole to going against a dinner of fried chicken with the usual trimmings.

Our work was divided at the patrons' houses "into two parts: I was to inspect the apparatus inside and my helper the outside, both of us looking out for the dog. Between stations, we replace broken glass, pull up slack, straighten poles, tighten guys and josh with the farmers along the way.

The idea of this letter is not so much to display a technical knowledge of the intricate art of telephone engineering as it is to let the brethren in other places know what we run up against in our humdrum daily lives far from the life and gayety of the great metropolis. I am also refraining from the use of algebraic formulas, as they are confusing to some of us linemen; then, besides, I do not know any, having sold my new algebra on the first day of school to a fellow student, who did not know any better than to pay perfectly good money for such trash instead of going up against the problems of life unprejudiced and unhampered.

The first case of trouble was a badly leaning pole in very soft ground. We reckoned that we would come along there another day with a bag of sand, an iron pipe and a funnel; then, after straightening the pole up, push the iron pipe down alongside until it struck the empty place just vacated by the bottom of the pole, and then pour the hole full of sand, thus saving work and doing a good job. We don't know yet how it will work but it "listens" like.

The next case was at 23-3. The lady presiding over the destinies of that household, informed us that she had had a little trouble lately in making folks hear her; not that she used the telephone much—seldom going near it except on business—but when she did need to use it, she wanted the thing to be in working order.

"'f we used our 'fone as much as some I c'd tell y' of on this line, I guess you'd have some cause t' kick, but we don't and I was a tellin' John only this mornin'. S'I t' John, 'you'd better go into that telephone office and tell them air fellers that if they can't come and fix it, they'd better come and take it out; and while you air there, you'd better pay them for what we owe, so's't they'l quit a sendin' them dunnin' letters.

"My sakes alive! But the folks on this here line do a lot of rubberin' when I want t' say something, which ain't right, and more'n that, I heard Tillie Johnson tell Alice Moritz jest the other day, when I went t' the 'fone t' see if 'twas our ring, that I was a hangin' on t' the line most o' the time an' went t' bed with th' receiver t' my ear. I tell y', it made me mad and more so cause that ain't th' first time I've heard her make remarks about me over t' 'fone; an' if y' can't make folks stay off'n this line when 'taint their ring, you'd better take their 'fones out so th' rest of us can have some peace."

Assuring her that we would take the matter up (which statement is number 96 in our list of stereotyped statements) we took out some three months' old batteries which looked like they had a bad case of smallpox, and asked the lady if their apple crop was turning out as good as she expected. Being assured that it was fair and reluctantly accepting some to take along to eat on the road, we passed on our way rejoicing, for it is always a sure sign that the harder the roast, the more they will heap favors on you, after they have it worked out of their system.

Wise is the lineman who hears much, says little and admires the hand painted china done by one of the girls who never took a lesson in her life; for verily I say unto you, the way to the watermelon patch will not be denied him.

Well Clay.

Another One From Uncle Dick.

EDITOR TELEPHONY:

I had Pete Nevens down here the other night, helping me figure out how much of a house I can build with the money I have in hand. Or whether it would pay us to try to rebuild the old house, which is leaky, out of plumb, and otherwise affected by long use and exposure, to say nothing of the lack of care. I suppose if he had been a telephone engineer, he would have said:

"Well, Dick, I'm building a line of square houses this year and nothing else. They cost so and so. If you haven't money enough, better scratch around and get the balance. Square house or nothing."

But Pete isn't that kind. He can build anything from a boot-jack to a hexagonal church spire with red shingles. He looked over the old house and told me what he could do with it. Then he took my plans for a new one and looked them over. Then he said:

"If I fix the old house over, it will cost almost as much as a new one and still it will be an old house. Now, in your plan here, you are shy one bedroom, you say."

I told him we could manage for a few years, anyway until Buddy and Tweedles grew up.

"But you don't need to," he went on. "You've got floor space enough by running this partition that way, and this one this way; bring your stairs up here and cut two feet off the end of the hall, and you'll have another closet thrown in for good measure. And it won't cost any more."

If telephone men could get that kind of advice from somewhere, it would help a lot, according to my idea. I could have afforded to give Pete five dollars for that evening's work and will probably do it Christmas, if things come out as he plans they will. I did pay a fellow from Chicago $20 for coming down and going over the heating proposition, steam, hot water, dry air, vapor and all that. I don't know yet what I want. But when the salesmen come here, I will know a little more about how much of his talk to believe and how much is "knock" at the other fellow. When I buy, I'll know what I'm paying for.

According to "Constructive Critic," a great many telephone men don't know what they are paying for, and I believe it's a fact, too.

You remember Doc. Stuver built a system in our town. He rather made a "foozle" of it, as everyone thought he would. Well, a fellow came along and bought it out.

The first thing he did was to raise the rates. To pacify the kickers he put in all new instruments. Well, his new instruments didn't come up as well as the old ones; that is, on two cells of battery, so he had to add a third cell. It happened I knew a fellow, down the road a ways, who wanted some instruments. He came here and bought the old ones for 50 cents apiece. He's got them in service now, working O. K.

This, of course, happened on a small scale, but instruments are being changed every day all over the country and the total of such transactions must amount to a "pretty penny." A sales engineer doesn't need much for talking points in such cases. Any ambitious blockhead can be shown that a new instrument is better than an old one.

If this fellow had nosed around a little, he would have found that a few of us here could have helped him get an increased rate, for everyone knew the thing never paid at the rates Doc. instituted. The salesman wasn't to be blamed, nor the factory engineer, nor anybody else but the man himself. I guess they told him all he wanted to know.

If I sell a horse to anyone but a particular friend, I only answer the questions he asks. If I find he is dickering with someone else, I may add a little information, the same as any salesman has a right to do, so long as it's the truth.

Somehow, I can't keep poles out of my letters. Guess I'm a little like Old Riley Olcott. In the early days he worked as "sea captain" on the Erie Canal. Well, it didn't matter whether it was at the regular evening's congregation around the stove in the post office, or at a wake, or what the subject under discussion might be, when it came Riley's say, he'd begin at one end of the "big ditch" and go clear through to the other, stopping off here and there in passing.

There are some economies which could be effected in pole line construction which I wonder have not been put into practice; for instance, stenciling poles. It is the practice of some companies to mark poles in consecutive order. As a matter of record this is good practice. The cost, I believe is small per pole; less than five cents—say three. The present method of painting a background to make the numbers more clear and lasting will cost all of that.

For practical purposes, is it necessary that every pole should be stenciled? I think it is some sheep raiser's idea. You know one sheep looks very much like another and it is necessary to stencil a mark on each one, if you wish to keep your flock intact, for the beasts will find holes in perfectly good fences and stray away. But a pole is different; they usually stay a long time in one place.

A very small percentage of them are referred to during their period of service in the line. Would not a stencil on every fifth pole, or in some cases even every tenth, be sufficient? To stencil every fifth pole would cut the cost at least one-third. Every pole could be recorded by number even though it did not carry its insignia on its back.

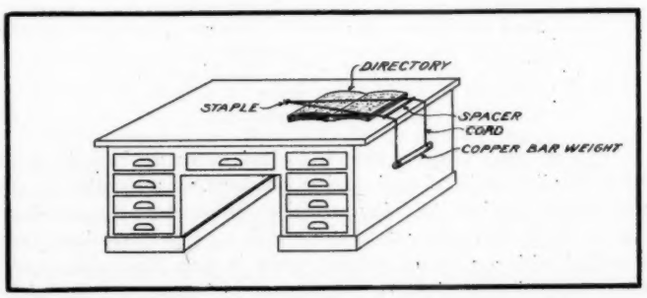
You didn't say anything about the price of hogs when you wrote me. When I butcher, I might spare you a ham or a hog's head. Which do you prefer? That corn I raised was a failure as we have to split the kernels with an axe, for the hogs can't even get hold of the corners of a full sized one. We are going to get in a buzz saw and saw the cobs to stove length.

Yours truly, UNCLE DICK.

A Directory Opener.

A simple yet convenient device for keeping a telephone directory open, while the number is being read in telephoning, consists in fastening a cord (ornamental or otherwise) to the subscriber's desk by means of a staple or other fastener suitable for the purpose. The two ends of the cord are allowed to extend down over the side of the desk to a suitable weight, such as a piece of polished copper of about ¾-inch cross section and about five inches long, the ends being fastened to the copper bar and spaced about four inches apart. Another spacer of wire is placed in the cord, so as to come on the desk, and also to provide a handle for readily lifting the cords off and on the directory.

The directory is opened at the desired page and placed under the spaced cords, which serve to keep it open because of the weight attached to them. The number may



be read off or referred to easily, without requiring any further attention or effort to keep the book open. The cord has the advantage of always being convenient without being in the way.

Washington, D. C. H. P. Connor.

Method of Plant Inventory in Nova Scotia.

The Maritime Telegraph & Telephone Co., of Halifax, Nova Scotia, Canada, reports that, in accord with an order of the Board of Public Utility Commissioners, the plant department is engaged in making a complete inventory for

appraisal purposes. It is hoped to have this work completed by Christmas. The order of the commission was received in the middle of September and plans had then to be formulated and a routine written up setting forth instructions as to how the work should be done in the shortest time and the most efficient manner. Forms had to be drawn up and adopted and competent men chosen and relieved from regular duties and instructed in the work.

The first crew was organized on September 25 and by October 12 four crews had been organized. The province of Nova Scotia has been divided into four sections or divisions, a touring crew being allotted to each division. Each division is in turn subdivided into routes or sections of pole line, each route being numbered from one up, for the entire province. All branches of the main route bear the same number as the main route, supplemented with a letters *a*, *b* or *c*. The routes and their branches are composed of different sections of pole lines, in order to keep a separate record of all those portions of pole line which are geographically situated or physically different from the section of pole line immediately adjoining.

Each touring crew is composed of one man in charge of the work with an assistant. They use a motor car and driver. As they pass through the different operating districts, a local man of each district, who is thoroughly familiar with plant conditions in his district, accompanies the touring crew in order that he may supply information regarding local conditions of pole lines, thus assisting in expediting the progress of the work.

Forms on which the inventory is taken, and maps on which all geographical records are noted, are made, edited and scrutinized at the end of each day by each crew, and sent into the plant department at Halifax, where as fast as they are received, they are summarized on a large summary form.

The class of plant to be inventoried by the touring crews consists of toll pole lines, exchange rural lines, and exchange local lines in towns not on list of incorporated towns.

The inventory of exchange plant in all the incorporated towns is to be taken separately and not by the touring staff, the idea being that such work can be accomplished without great inconvenience later in the season, while it is desirable to get over the country roads as early as possible. The touring staff will therefore inventory all plant located and situated between limits of incorporated towns.

The exchange plant comprises all plant other than toll wires and toll equipment within corporate limits of any town or city, and all rural poles and wires both within and beyond the limits.

The toll plant comprises all pole lines carrying toll wires outside corporate limits of any town or city, and all attachments thereto, except rural and exchange wires and insulators, also all toll wires and insulators on exchange poles within the corporate limits.

Each crew is provided with copies of white print area maps, scale 2 inches to 1 mile, for the purpose of locating pole lines, and their branches and plotting them on these maps, and to mark thereon the location of all towns, villages and hamlets, county boundaries and municipal boundaries. Each crew is also provided with a blueprint wire map of the territory through which it is touring.

Each motor car is equipped with an odometer, by means of which all distances are measured, for the purpose of obtaining the lengths of pole lines and wire circuits. Measurements required for underground conduit, cables and loops, etc., will be made by means of standard tape line. All county and municipal boundary lines will be marked on the pole record of the pole nearest the boundary line, as well as on the whiteprint map.

Bell Company Earnings for Nine Months.

A report of the earnings of the American Telephone & Telegraph Co. for the nine months ending September 30, 1914, with comparative figures for the same period in 1913 and 1912 shows the net earnings to have been about the same as last year. In the 1914 column the figures of net telephone traffic for one month are estimated.

	1914.	1913.	1912.
Dividends	$18,922,626	$19,352,982	$17,670,133
Interest, other revenue	10,671,379	10,040,940	9,278,780
Telephone tariff (net)	4,223,279	4,276,616	4,013,917
Real estate	—	—	53,057
Other sources	685,629	529,442	257,973
Total	34,602,914	34,199,981	31,273,860
Expenses	4,112,484	3,850,360	3,500,666
Net earnings	30,490,430	30,349,621	27,773,194
Deduct interest	6,241,562	5,706,357	4,176,605
Balance	24,248,867	24,643,264	23,596,589
Dividends paid	20,679,164	20,561,971	19,320,830
Balance	3,569,703	4,081,292	4,275,758

A report of the American Telephone & Telegraph Co. and associate holding and operating ocmpanies in the United States, not including connected Independent or sublicense companies is also issued for eight months ended August 31. All duplications, including interest, dividends and other payments to American Telephone by associated holding and operating companies, are excluded. The figures follow:

	1914.	1913.	1912.
Gross	$149,669,237	$141,963,035	$129,615,075
Operation	54,278,573	49,677,539	42,384,436
Current Main	21,230,968	21,142,752	20,871,580
Depreciation	27,176,026	24,809,543	22,251,630
Taxes	8,079,716	7,225,006	6,727,591
Total expenses	110,765,283	102,854,840	92,235,237
Net earnings	38,903,954	39,108,195	37,379,838
Deduct interest	12,547,139	10,994,010	9,073,075
Balance net proceeds	26,356,815	28,114,185	28,306,763
Dividends paid, est.	20,277,995	20,189,628	19,429,417
Surplus after div.	6,078,820	7,924,557	8,887,346

Convention of Wisconsin State Telephone Association.

The annual convention of the Wisconsin State Telephone Association will be held at Madison, Wis., on February 10, 11, and 12, 1915. This three-day session should prove an interesting occasion as the telephone service rules promulgated by the Wisconsin Railroad Commission will then have been in operation for six months and the results of their operation will be discussed by representatives of the various telephone companies. An effort will also be made by the association to put telephone collections on a more uniform basis throughout the state. The bringing up of this matter will be welcomed by many of the companies which are rather at a loss as to how collections should be handled. It is certain to develop a profitable discussion.

Dancing As Rest for Telephone Operators.

The Southwestern Telegraph & Telephone Co. has installed a piano in the rest room for its operators in its Forth Worth Building, Fort Worth, Texas. A majority of the girls now spend their rest hours in dancing the modern dances. The girls play the piano themselves and the dancing goes on at all hours of the day and night.

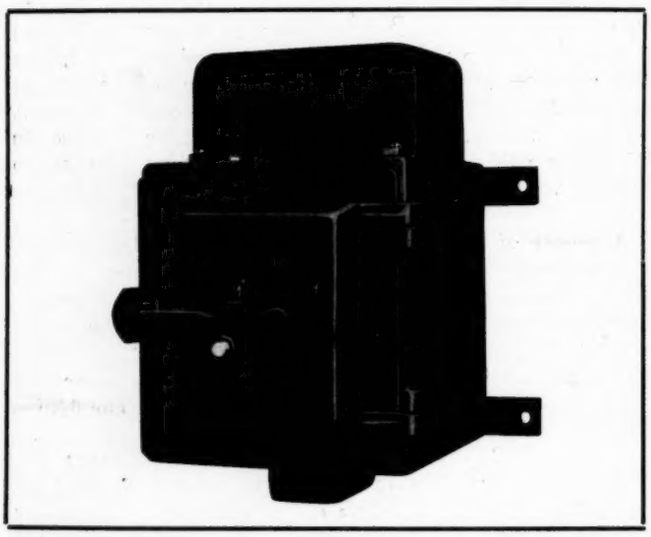
Mrs. S. O. Lovejoy, matron of the company, approves of the experiment. The girls off duty alternately every hour of the 24 prefer dancing to lounging, she says, and seem as refreshed after this diversion as if they had spent the rest hour lolling and gossiping.

From Factory and Salesroom

Conventions: Texas, Waco, November 5, 6; Eastern Pennsylvania, Reading, November, 5, 6; Canadian, Toronto, Ont., November 11, 12; South Dakota, Sioux Falls, December 16, 17, 1914; Wisconsin, Madison, February 10, 11, 12, 1915

Stromberg-Carlson's Mine-A-Phone Improvements.

The latest type of mine telephone manufactured by the Stromberg-Carlson Telephone Mfg. Co., of Rochester, N. Y., has a new feature in the push button shown at the door's center in the accompanying illustration. When this push



Stromberg-Carlson Mine-A-Phone With Push Button Release.

button is pressed by the palm a catch inside is released, the fingers grasp the handle and swing the door free. With this new device one hand performs easily the function that previously required two hands. The instrument has also been made doubly proof against the entrance of gas. The outer door has always been thoroughly gas, acid and water tight. In addition, the inner door has now been made so.

The equipment of this instrument includes the same operating elements as a regular magneto instrument, but the parts in themselves are especially designed for underground service, and are consequently built heavier. The transmitter is of the long distance type, made up so as to be water-tight. The receiver is of standard form, having moisture-proof cord. A five-bar hand generator furnishes alternating current for ringing, while the energy for talking purposes is drawn from the dry cells. The hook switch is not operated by gravity under the weight of the receiver, but is actuated by wedging the receiver between the double jaws of the hook. Altogether it is said that the Mine-A-Phone is proof against all the harmful elements found below ground—even explosion.

Reinforced Concrete Cross Arms.

Cross arms of concrete, reinforced with twist steel rods and covered with steel to prevent the corners and edges from chipping off in rough handling, are the subject of a circular sent out by O. P. Megahan of The Ohio Cross Arm Co., of Columbus, Ohio. It is declared that these cross arms are stronger than wood and cannot be broken apart. The steel cover is of thin material primarily used as molds. It protects the corners and edges from chipping off in rough handling. In a few years the steel shell will flake off in rust until it has completely disappeared, leaving the gray colored concrete to serve for a very long period.

Reviving the Lost Art of Soldering.

That soldering had become a lost art is the view of the M. W. Dunton Co., of Providence, R. I., and that company has taken an important step in the attempt to revive it. The company manufactures an inexpensive solder kit, and has compiled a set of instructions on soldering, both of which have been especially gotten up with the purpose of teaching the art of soldering to those who are not familiar with it. The company asserts its belief that this is the only practical solder kit on the market today.

The company found, upon attempting to exhaust the subject of soldering, that the public library contained practically nothing, and that there were no books of real value, published on soldering. Therefore the M. W. Dunton Co. compiled, at great expense, approximately 500 different soldering suggestions, and these are issued from time to time. With its solder kit it furnishes copyrighted instructions and directions which are the outgrowth of its work, and which can only be purchased from this company.

The Nokorode solderkit, as it is called, consists of a well made pine box, with sliding cover, the box being 12½ inches long, 3½ inches wide, and 2½ inches high. It contains a soldering copper weighing one-half pound, and having its point tinned, two strips of emery cloth for brightening the surface to be soldered, a box of Nokorode soldering paste, a stick of solder, a roll of friction tape, and the complete and valuable soldering directions issued by the company. These various articles are shown in the accompanying illustration. The directions explain in plain language that any one can understand, all of the "mysteries of soldering" and enable the novice to do a workmanlike job.

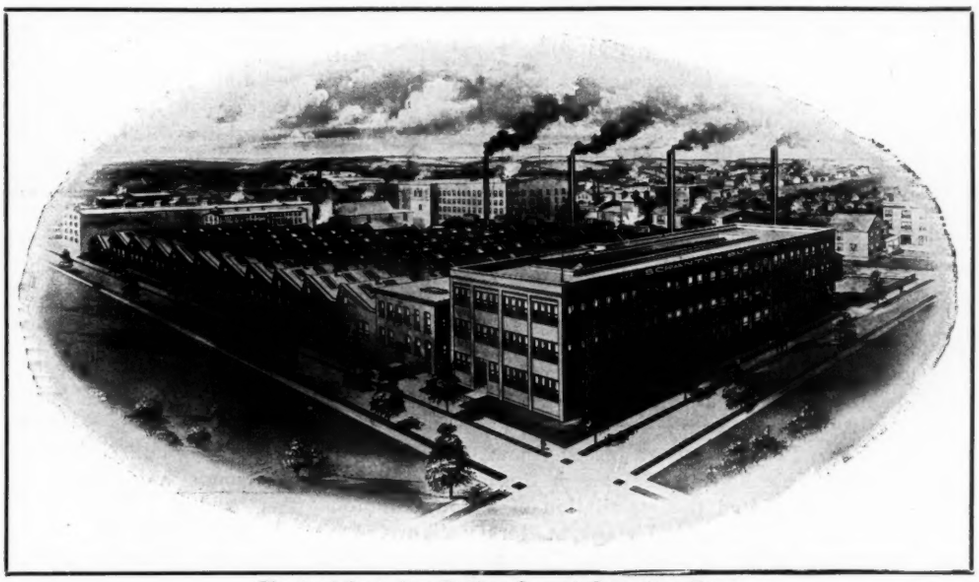
In commenting upon the various articles in the outfit the company points out that the soldering iron is suitable for

Contents of the Nokorode Solderkit.

any kind of soldering job, and that a smaller iron would not hold the heat. Nokorode paste is declared to be as far ahead of acid as acid is ahead of resin, and that the secret of this kit is declared to be in the Nokorode and in the directions. It is declared that the emery cloth included with this outfit will outlast a pipe scraper.

Plant of the Scranton Button Co.

The Scranton Button Co., of Scranton, Pa., has become well known in the electrical and telephone fields because of its excellent line of more than 40 styles of receiver cases, corresponding number of mouthpieces, a great variety of pony receivers, bushings, crank handles, mounting blocks, push buttons and knobs, socket rings and keys, number pegs and contact plugs, etc., made from Scranton electroid material. The manufacture of its molded electrical insulations used in the production of telephones is done at the company's extensive plant at Scranton, Pa., a view of which is shown in an accompanying illustration.



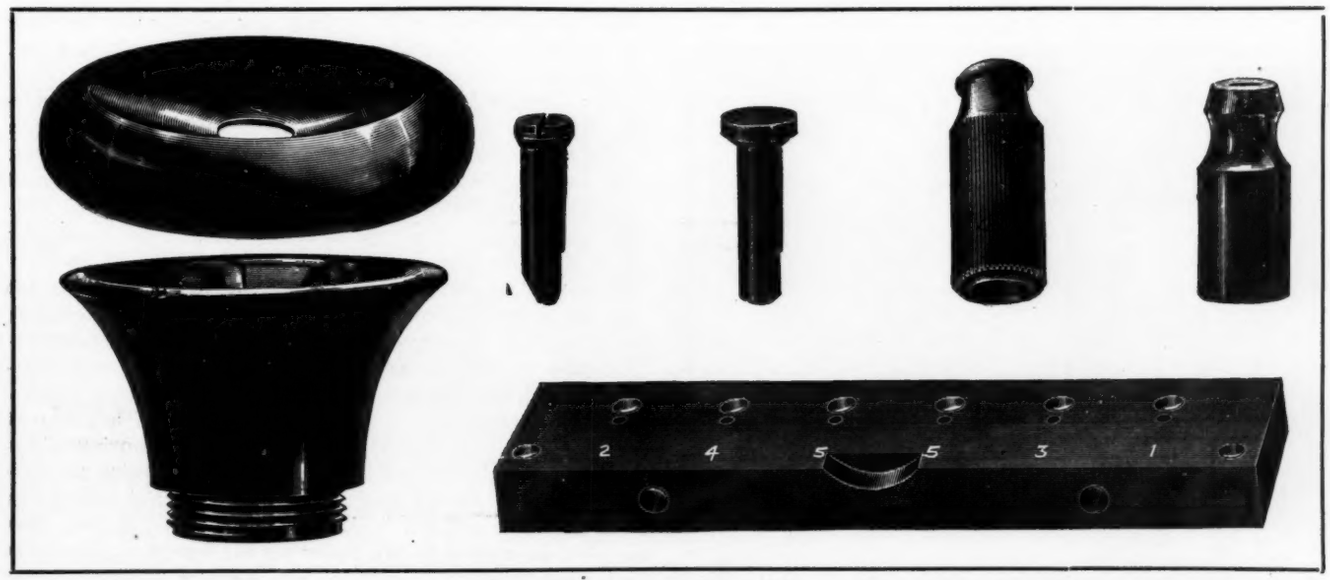
Plant of Scranton Button Co., at Scranton, Pa.

These buildings have over 100,000 square feet of floor space, every foot protected by automatic fire extinguishers. The construction is largely concrete and iron, and practically fireproof. Two large Corliss-Harris engines and a battery of boilers aggregating 20,000 horsepower, supply power and steam. Two modern type, direct driven electric generators of 35 horsepower each, furnish electric current.

The plant has an installation of the best modern machinery, a large proportion of which was built on the premises by the company. The die making department is equipped with the highest grade of machinery and tools necessary to make fine steel dies and molds. Two years ago, although confronted by the prospect of unsettled business conditions throughout the country, this company, not depending on luck but following its customary constructive policy, nearly doubled its capacity, thus showing its faith in the future of the American market.

The company has a satisfied clientele. Its products show an excellence of design and construction—the result of liberal co-operation between the company and its customers. The company is prepared to furnish mouthpieces for all standard telephones and to make special threads or designs to order. These mouthpieces are declared to be superior in point of finish, strength and mechanical accuracy. The receiver caps include the watch case, pony and baby caps and a great variety of shapes and designs to meet all requirements. The company manufactures a fine line of seamless receiver shells, made of strongest electroid material. These, it is declared, do not lose color and in many cases are superior to rubber shells.

A catalogue setting forth the merits, characteristics and limitations of its products will be furnished by the company on application at its main office at Scranton, Pa. The company is represented by Geo. T. Westcott & Co., 15 No. Jefferson St., Chicago, Ill., and R. S. Mueller, 423 High Ave., Cleveland, Ohio.



Scranton Electroid Mouthpiece, Receiver Cap, Number Pegs, Generator Crank Handles, and Telephone Mounting.

Kellogg Company Gets Pittsburgh Orders.

Three exchanges of the Pittsburg & Allegheny Telephone Co., of Pittsburgh, Pa., at Sewickley, Bellevue and Oakmont, are each to have a new and latest type automatic recall switchboard as manufactured exclusively by the Kellogg Switchboard & Supply Co. Each of these three exchanges will have an ultimate capacity of 800 common battery lines.

The Kellogg company will furnish complete power plant

equipment with four-party harmonic ringing. Complete new telephone equipment will also be provided. The sets, being of the new induction coil type, give excellent service in local as well as long distance use.

In addition to what has already been done in Pittsburgh proper, especially to improve the long distance toll lines, these new exchanges carry out the economical, energetic policy of the Pittsburgh & Allegheny company for the furnishing of a better telephone service. Incidentally, the company has also been following up its improvements with an interesting advertising campaign.

The long distance toll lines to the main exchange at Pittsburgh have been in cables for many years, but now they have been changed to open wires. This improves the long distance transmission 35 per cent., doing away with a great deal of previous losses in the cable. General improvements of this nature for the benefit of the property are now going on and are being planned for continually.

The present officers of the company are: Cyrus Huling, president; Richard Hawkey, vice president and general manager; Louis Muhleizler, chief engineer, and C. D. Thompson, purchasing agent.

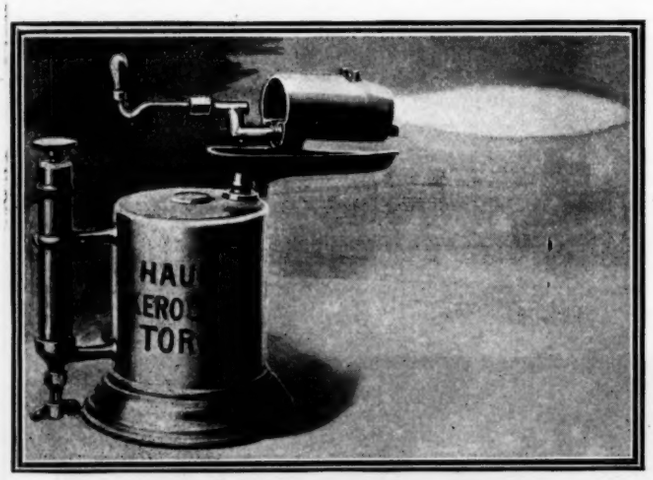
New Switchboard at Jersey Shore, Pa.

The United Telephone & Telegraph Co., of Harrisburg, Pa., recently completed the installation of a new common battery, multiple type switchboard at Jersey Shore, Pa. The switchboard is of Garford Mfg. Co.'s manufacture and the Dean four-party, harmonit, selective signaling system is used.

The Hauck Kerosene Torch.

A kerosene torch of new and novel design has just been placed on the market by the Hauck Mfg. Co, of Brooklyn, N. Y. It is especially intended for places where the use of gasoline torches is prohibited or restricted, and where gasoline is not obtainable.

The most important feature is the construction of the bronze burner. The oil passageways are especially large and so arranged that only one plug has to be unscrewed in order to clean the whole burner instantly. By a special oil-regulating valve the flame can be adjusted to any size



Hauck Quart Kerosene Torch.

from eight inches long by one inch in diameter, to the finest point.

As kerosene contains high heating value, it is well adapted for brazing and soldering in cable and armature repair work, for burning off insulation, etc.

It is claimed that the strongest wind or cold weather will not effect the flame in any way, and it is therefore especially recommended to linemen and electricians. The torch is also furnished in connection with a light furnace for melting solder and heating soldering coppers.

Recent Publications of the Kellogg Company.

A number of bulletins and booklets of considerable interest have recently been issued by the Kellogg Switchboard & Supply Co. One of these is a postal card in colors showing the company's magnificent new factory building, nearing completion. This immense structure offers about four times the space of the combined present factories, which will bring every department, excepting the woodworking plant, under one roof. This will effect a great saving in time, and will increase shipping facilities to a marked degree.

The company has published some new attractive little folders on Kellogg apparatus. One of them is a description of the Kellogg No. 14 arrester rack, giving complete information and prices, and another is a folder on two station party line telephones, emphasizing the value of giving telephone service of this character in moving picture houses, etc. There are also several new bulletins and price lists on telephone and line construction material.

The new bulletin on construction material, No. 76, is an largement and revision of the company's former book on this subject. This No. 76 bulletin should be of value to every telephone man. It is not a mere list of construction materials and supplies. It gives the standard sizes and tells why they are standard, where they are to be used to the best advantage, and other details of construction which are very helpful, especially to small companies.

A bulletin which is a revision of an older edition on switchboard cable and switchboard wire, is also just off the press. This book is No. 78. No. 77, covering the popular new type magneto and universal sets, is now in its third edition.

All of these bulletins are valuable to have, no matter what types of telephones or switchboard are used.

Paragraphs.

STEWART BROTHERS, Ottawa, Ill., makers of testing instruments, are mailing to the trade a new circular on the cable tester and test and if any company should fail to recive one, the company will mail one on request.

THE GARFORD MFG. CO., of Elyria, Ohio, made its headquarters in Parlor 9 of the Hartman Hotel, during the convention of the Ohio Independent Telephone Association, at Columbus, Ohio, on October 29 and 30, and prior to the convention issued a cordial invitation to Ohio Independents to make their headquarters there too. The announcement was sent out in a folder cut to the same shape as the state of Ohio.

WALTER B. SNOW, publicity engineer, Rooms 511-516, No. 136 Federal Street, Boston, Mass., is sending out an interesting folder on the front page of which appears an engraving reproducing an effective arrangement of publications and booklets to which he and his staff have contributed technical articles. An inside page shows a similar reproduction of a group of the headings of the articles contributed. Accompanying this is a list of the subjects that have been treated, showing the versatility of Mr. Snow's staff in handling technical subjects in advertisements, articles, booklets and treatises. Mailing lists are also maintained by Mr. Snow for the benefit of patrons in varied industries.

Telephone Traffic Falls Off in New York City.

Telephone traffic is reported to have fallen fully 15 per cent. in lower Manhattan and to some extent all over New York City as a consequence of the general business depression resulting from the war.

In the Rural Line Districts

The telephone company is taking its wires from the poles in front of the stores on the square and putting them in the alleys, and then down comes the poles.—Johnson Co. Journal, Tecumseh, Neb.

The Creston Mutual Telephone Co. is now serving its patrons both in the city and country, from the new switchboard, the installation of which is completed. The company cut over from the old to the new switchboard, and considering the fact that the system is almost entirely new to the "hello" girls, they are doing remarkably well.—Creston (Ia.) Advertiser.

The telephone company is busy changing the telephones. They are on their last work in the country, the 185-line being the last to change.—Lawrence Item, De Pere (Wis.) Democrat.

E. F. Stolp is putting up a building opposite the postoffice, which will be used for a telephone exchange.—Oronoco Item, Pine Island (Minn.) Record.

The telephone system at Drake is now owned by Leonard Jacobson, son of the former proprietor.—Fargo (N. D.) Forum.

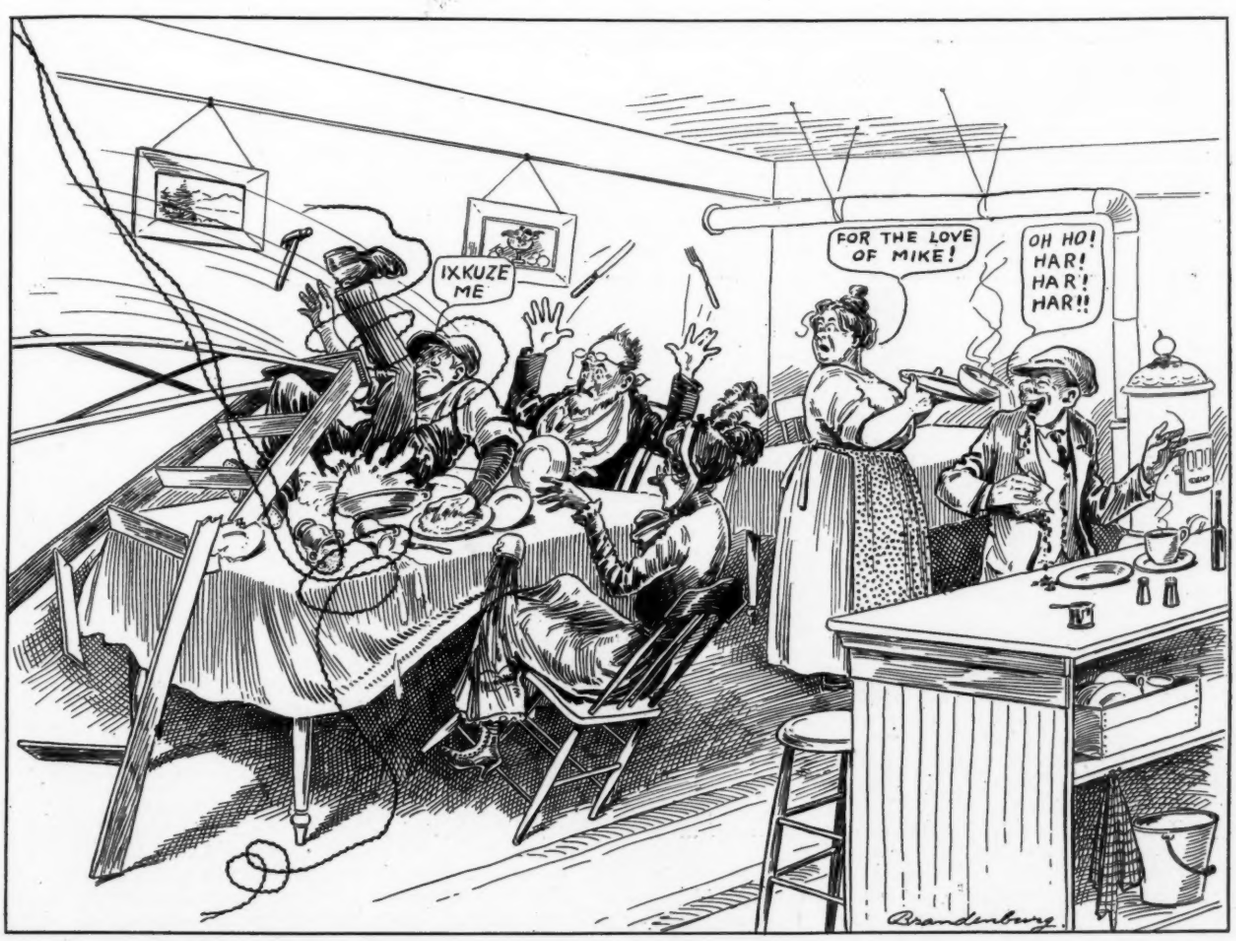
The Abingdon Home Telephone Co. expects to have its new system of telephones in order by the middle of next week and the bother and trouble that have been prevalent since the work started will be over. The new system is a great advance over the old and much better satisfaction will be given to the subscribers. New instruments have been put in all over the city and the work has been quite extensive.—Galesburg (Ill.) Mail.

Manual Shrock has bought the Spivey Telephone Exchange from J. L. McDavitt and promises to give us first class service from now on. Let us all pay up so Mr. Shrock can get money to put the line in good shape.—Kingman, Kan., Courier.

Old telephones on the farmers' lines are being exchanged for new ones as the farmers' lines have not been running very successful for several months. The users thereof will be glad to make the exchange.—St. Clair (Mich.) Republican.

The Mutual telephone company's manager, Geo. W. Cox, and his assistants, have been here repairing the lines and putting some of the phones in working order.—Jacksonville Item Harlan (Ia.) Republican.

The Zenith Telephone Co., of Duluth, is extending its lines out through the county. Most all the farmers are planning on having the telephone installed in their homes. It is not merely a farmers' telephone, but will connect with Duluth.—Hermantown Item, Duluth (Minn.) Herald.



While Jim Evans was wiring the Palace restaurant for a telephone yesterday about noon, the step ladder on which he was working suddenly collapsed, and Jim landed in the middle of a hot dinner which had just been served to a couple of patrons. The situation was rather embarrassing, especially to Jim who is a very modest young man. The dinner was ruined and the china badly damaged, but as the catastrophe was purely accidental, Jim was exonerated from all blame. Another dinner was soon set before the guests and everybody was satisfied.—Waterfield (Ohio) Examiner.

Record of Telephone Patents Recently Issued

1,109,686. September 8, 1914. TELEPHONE EXCHANGE SYSTEM; F. R. McBerty, New Rochelle, N. Y.; assigned to Western Electric Co. Covers automatic switching apparatus and sending mechanism located in the central office. Call storing registers are responsive to impulses from the lines connected with the impulse sending mechanism. When a call is made, an idle call storing register is connected to it.

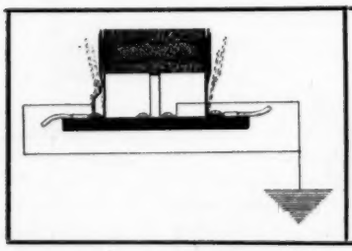
1,109,703. September 8, 1914. TELEPHONE EXCHANGE SYSTEM; F. N. Reeves, New York; assigned to Western Electric Co. In this patent is described an automatic system in which a power driven, trunk hunting selector switch is the feature.

1,109,919. September 8, 1914. SWITCH KEY; Albert F. F. Gibson, Closter, N. J.; assigned to Western Electric Co. The feature of this key is the provision of a resilient portion on one of the springs to absorb the inertia of the operating member of the switch spring when the latter is thrown into engagement with the other key springs.

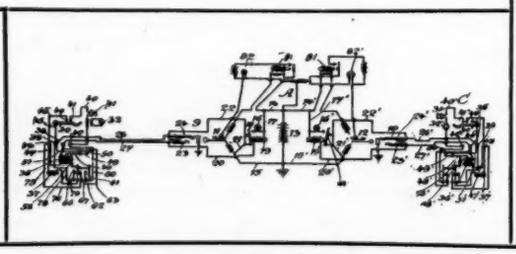
1,109,947. September 8, 1914. SWITCH KEY; G. P. Tromp, New York; assigned to Western Electric Co. A brake is provided to prevent rebound of the switch springs when operated. A loop shaped part having an extension is combined with a master spring contact. The contact member has a shoulder formed where the loop is made, so that the shoulder functions as a stop for an extension on the loop shaped part when the loop is compressed.

1,109,960. September 8, 1914. AUTOMATIC TELEPHONE TESTING SYSTEM; W. L. Campbell, Chicago; assigned to First Trust & Savings Bank, trustee, Chicago. Mechanism for making a manual test of the busy, or idle, condition of lines in an automatic exchange, is described in this patent.

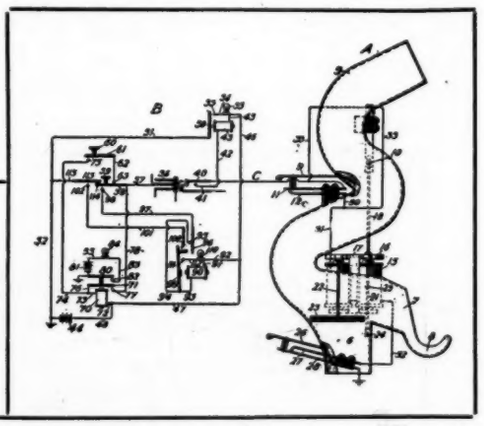
1,110,027. September 8, 1914. TELEPHONE SWITCHING SYSTEM; Wm. Aitken, Liverpool, England. Automatic mechanism for installation at a branch exchange is described. Line jacks in the branch exchange are normally connected with the respective extension lines through an electromagnetic switch mechanism. This mechanism is adapted to selectively remove one of the extension lines from connection with its respective line jack, and place it in connection with a trunk line to the main exchange. Upon termination of the call, the switch mechanism is adapted to disconnect the extension line from the trunk and restore it to connection with its respective line jack.



No. 1,110,259.



No. 1,110,669.



No. 1,110,634.

1,110,071. September 8, 1914. AUTOMATIC TRUNKING SYSTEM; E. A. Mellinger, Chicago; assigned to Automatic Electric Co., Chicago. In this system, subscribers' stations are divided into a plurality of groups and a trunking switch is located at the central station for each subscriber. A set of trunks terminate only in the switches of one group, while another set terminates only in the switches of another group. A third set terminates in the switches of all the groups. The set of trunks common to all the groups are normally precluded from use, but, whenever all the trunks of any group are in use, the common trunks are rendered available for service.

1,110,228. September 8, 1914. TELEPHONE RECEIVER; A. Plecher, Las Animas, Col. The feature of this receiver lies in a diaphragm having central and marginal vibratory portions. A support is placed between the central and marginal portions leaving the marginal portion wholly free. A magnet is located in inductive relation to the marginal free portion of the diaphragm. It is of annular form and constructed to act on the diaphragm adjacent to the periphery.

1,110,259. September 8, 1914. ELECTRIC LINE APPARATUS PROTECTOR; P. K. Higgins, Los Angeles, Cal.; assigned to F. R. Parker, Chicago. This invention broadly covers celluloid and all heat softenable dielectrics used for lightning arresters.

1,110,420. September 15, 1914. MICROPHONE ATTACHMENT FOR TELEPHONES; H. W. Christensen, Boston, Mass. A feature of this invention is a transmitter having a flaring mouthpiece and an air passage at the base of mouthpiece comprising a thin metallic vibratory diaphragm. A non-vibratory rim, having oppositely disposed flanges, engages the metallic diaphragm and the regular mouthpiece, while a band seals the air passage between the mouthpiece and the shell of the transmitter.

1,110,430. September 15, 1914. ELECTRICAL RELAY; John Erickson, Chicago; assigned to First Trust & Savings Bank, trustee, Chicago. This relay is provided with a group of switch springs and contacts which are removable as a unit. A movable circuit closing member is adapted to be pressed into engagement with the platinum contact members.

1,110,460. September 15, 1914. AUTOMATIC TELEPHONE EXCHANGE SYSTEM; Fred Schoenwolf, Chicago; assigned to Kellogg Switchboard & Supply Co., A relay controlled selector is used for making connection with the calling lines. Mechanism is provided, which operates responsively to current over the lines to close one contact in the circuit of the relay, while another contact is closed by independently actuated means at the exchange.

1,110,492. September 15, 1914. SELECTOR SWITCH FOR AUTOMATIC EXCHANGES; William Kaisling, Chicago; assigned to Kellogg Switchboard & Supply Co. This selective switch includes contacts arranged in groups. A magnet and associated stop mechanism operates to effect long strokes of a driving pawl to cause the switch to select the group, and short strokes of the pawl to select contacts in the group.

1,110,613. September 15, 1914. AUTOMATIC TELEPHONE SYSTEM. Alfred H. Dyson, Chicago; assigned to Kellogg Switchboard & Supply Co. In this patent is described a means by which a trunk selecting switch operates. The feature is the application of a driving magnet for controlling the selection of groups of the terminal contact of the trunk.

1,110,634. September 15, 1914. TELEPHONE SYSTEM; Frank A. Linquist, Chicago; assigned to Western Electric Co. A coin collector is described. A coin chute having deposit and refund channels is provided at the substation. An electromagnet operated by current from the central office controls the disposition of a coin inserted into the chute.

1,110,669. September 15, 1914. COIN COLLECTOR FOR TELEPHONES; Arthur E. Case, Chicago; assigned to Delta Electric Co., Marion, Ind. A coin collector for toll telephone stations is covered by this patent. A coin collecting device is installed at the substation and mechanism is provided for operating it automatically to refund the deposited coin when the line is disconnected at the exchange, and before the subscriber restores the receiver to the switchhook.

1,110,834. September 15, 1914. SELECTIVE SYSTEM: Sidney C. Snow, Blakesburg, Iowa. The feature of this party line selective system is an electromagnetically controlled selector. A lever connected to the armature of an electromagnet and operated thereby, provides the means for operating a circuit controlling device.

1,110,913. September 15, 1914. TRAIN DISPATCHER'S TELEPHONE CIRCUIT: H. C. Egerton, Passaic, N. J.; assigned to Western Electric Co. This circuit is provided for the purpose of using either a loud speaking receiver or the ordinary

head receiver. By means of switches either receiver may be cut into circuit.

1,111,024. September 22, 1914. Two-Party Telephone System; H. F. Joeckel, Camp Point, Ill. Two substation talking sets are bridged across a local battery metallic circuit which is normally closed at the central office by an annunciator. An annunciator at each of the substations is normally connected to ground, one from each of the metallic circuit for the respective instruments. Means are provided at the central station to selectively signal either substation. A magneto, located in each instrument while normally on open circuit, is arranged to be placed selectively in circuit with the annunciator of the other station or with the annunciator at the central station, while at the same time disconnecting its own annunciator from the circuit.

1,111,253. September 22, 1914. Loud Speaking Transmitter; H. C. Egerton, Ridgewood, N. J.; assigned to Western Electric Co. This loud speaking transmitter is designed for announcing systems. Electrodes of the button type are connected to the diaphragm by a lever.

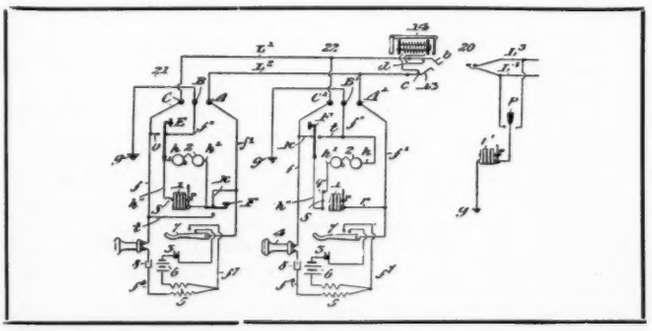
1,111,574. September 22, 1914. Line Protector for Telegraph and Telephone Systems; Tomas Sebasço, Habana, Cuba. This protector is made up of two parts. The line wires are connected at one end of a base section having a recess, while the local circuits are at the other end. A removable section is adapted to fit in the recess, and has contacts which engage with the contacts on the base section. On this removable part, fuse wires are placed. On the part of the base section toward the line, a grounded member has fixed contacts so arranged as to form an air gap with the line conductors, so that the electric discharges may take place to ground.

13,802. (Reissue.) September 22, 1914. Original No. 717,327. December 30, 1902. Automatic Electric Exchange System; W. R. Binkley, New Bedford, Mass.; assigned to Western Electric Co. An automatic apparatus controlled at the calling substation extends the circuit to a called party line. The calling station also has provision for selectively signaling any desired substation on a party line.

1,111,742. September 29, 1914. Automatic Toll Recorder for Telephone System; E. G. Godfree, Sandringham, near Melbourne, Victoria, Australia. A registering device is located in a circuit which has a consequent pole electromagnet adapted, automatically, to close the circuit when the desired parties are in communication. A second consequent pole electromagnet is adapted to open the meter circuit after a toll has been recorded.

1,111,792. September 29, 1914. Selective Signaling System; E. R. Gill, Yonkers, N. Y.; assigned to Hall Switch & Signal Co. A selector, comprised of a pair of coils, is connected in bridge with a metallic line. A connection is made to ground from a point intermediate of the coils while means associated with the ground connection control the operation of the selectors. Telephone and telegraph apparatus can be simultaneously operated with this circuit.

1,111,876. September 29, 1914. Telephone System; C. S. Winston, Chicago; assigned to Kellogg Switchboard & Supply Co. In this system, means are provided for the connection of magneto and common battery lines. A cord circuit is connected, at its answering end, to a magneto line. A trunk circuit connects with the calling end of the cord circuit, and is adapted for extending the connection to a common battery

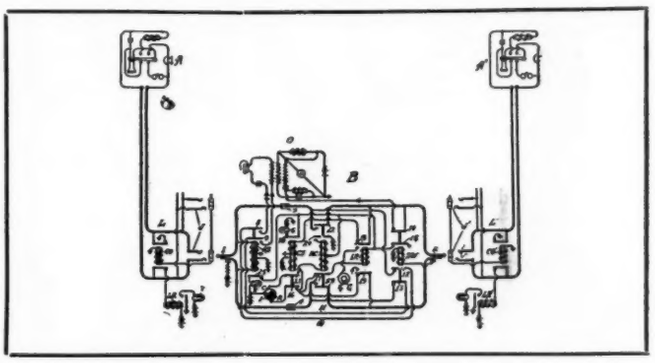


No. 1,111,024.

line. A pair of talking conductors is included in the connection between the lines and supervision is provided by means of relays and an independent control circuit.

1,112,140. September 29, 1914. Telephone System; D. S. Hulfish, Toronto, Ont., Canada; assigned to Canadian Independent Telephone Co. The features of this system are a call-answering plug. a ringing plug and a ringing key. The latter has contacts opening the talking conductors between the call-answering plug and its associated plug-pair apparatus, while ringing on the ringing plug.

1,112,167. September 29, 1914. Telephone Transmitter; J. L. Spence, New York, assigned to Electrical Experiment Co., Inc., New York. The diaphragm of this transmitter is made sufficiently stiff as to be substantially inflexible under condi-



No. 1,112,497.

tions of use. A resilient aperiodic mounting for the diaphragm is adapted to permit movements of translation of the diaphragm responsive to the impressed acoustic waves with a minimum of distortion.

1,112,291. September 29, 1914. Sanitary Mouthpiece; E. M. Jenkins, Italy, Texas. Spaced inner, outer and intermediate shells are the features of this mouthpiece. Disinfectant fluid is introduced between the outer and intermediate shells, and provision is made to permit the discharge of fumes through the inner shell.

1,112,370. September 29, 1914. Coin Controlled Pay Station for Telephones; A. B. Flagg and W. H. Livermore. Worcester, Mass.; assigned to Livermore Pay Station Co., Portland, Me. The parts making up the coin chute are so formed that when assembled a separator plate, or partition, is provided in the center of the coin channel. The object of this separation is to provide a method whereby the coin when dropped into the coin channel, will be so directed as to give a sound signal.

1,112,392. September 29, 1914. Telephone Receiver. J. L. Spence, New York, assigned to Electrical Experiment Co., Inc., New York. The diaphragm of this receiver is made sufficiently stiff as to be substantially inflexible under the operating stress for which it is designed. It is mounted in connection with a delicate pneumatic cushion which is adapted to yield readily to the movements of the diaphragm incident to operation.

1,112,415 September 29, 1914. Line Connector; D. W. Kneisly, Dayton, Ohio. This line connector for an automatic system consists of a polarized relay. The construction and arrangement of the relay is such that when an impulse is transmitted through the magnet in one direction, the armature is shifted into engagement with a detent. When the impulse is transmitted in the opposite direction, the armature is disengaged from the detent to release a switch which is under control of the electromagnet.

1,112,469. October 6, 1914. Antiseptic Holder for Telephone Mouthpieces; J. G. O'Donnell, Washington, D. C.; assigned to Chas. J. and Edward A. Helmsen, Washington, D. C. An outer shell, or case, is adapted to be attached to an ordinary mouthpiece. A perforated carrier, within the outer shell, holds a powdered antiseptic.

1,112,497. October 6, 1914. Telephone System with Automatic Ringing; R. I. Utter, Chicago; assigned to Kellogg Switchboard & Supply Co. A calling supervisory relay and a source of ringing current are adapted to be alternately connected in bridge with a called line. A ringing control relay and its energizing circuit is responsive to the supervisory relay. An interrupter prevents premature operation of the control relay through incidental momentary operation of the supervisory relay.

1,113,052. October 6, 1914. Safeguard Life and Telephone Attachment; I. E. Rosenthal, Argenta, Ark. A device is described for engaging the hook of a telephone set to establish the circuit. The mechanism of the device is so arranged that a fire alarm may be sent over the telephone circuit.

1,113,128. October 6, 1914. Annunciator; O. M. Leich, Genoa, Ill.; assigned to Cracraft, Leich Electric Co. A combined jack and drop is described. An armature and pole piece

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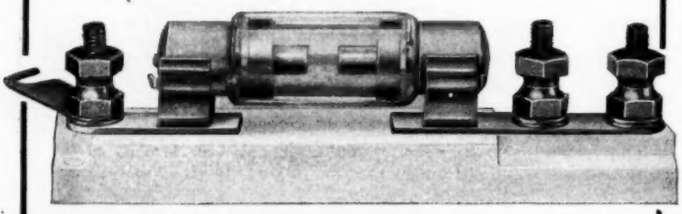

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are permanently mounted in the framework and a removable coil and core is secured in the framework, but independent of the armature and pole piece, the core being in inductive relation to the pole piece.

1,113,274. October 13, 1914. TELEPHONE TRUNKING SYSTEM; C. S. Winston, Chicago; assigned to Kellogg Switchboard & Supply Co. The feature of this trunk circuit is the supervisory relay. It is adapted to be operatively energized upon response from a called substation when connected thereto. The supervisory relay provides energization for the signal controlling relay to operate a signal. The signal is arranged so that it cannot be energized by an incidental momentary operation of the supervisory relay.

1,113,319. October 13, 1914. LINE PROTECTIVE DEVICE; John Erickson, Chicago; assigned to Automatic Electric Co. The feature of this protection device is the provision of a self-soldering heat coil. The heat coil has a U-shaped plate connected at one end. A pair of openings in the plate permits a supporting arm to pass in order to secure the heat coil to the arm.

1,113,321. October 13, 1914. COIN CONTROLLED PAY STATION FOR TELEPHONES; A. B. Flagg and W. H. Livermore, Worcester, Mass.; assigned to Livermore Pay Station Co., Portland, Me. This pay station is so arranged that a series of sound signals may be given upon the dropping of coins in the coin channel.

1,113,354. October 13, 1914. AUTOMATIC TRUNKING SYSTEM; A. E. Keith, Hinsdale, Ill.; assigned to Automatic Electric Co. A line switch is provided for each subscriber's line. A master switch controls a group of line switches so that the line switches may connect with an idle trunk. Means are provided whereby certain line switches have access to all of the trunk lines, while other line switches have access to only a part of the lines.

1,113,395. October 13, 1914. TELEPHONE SYSTEM; C. S. Winston, Chicago, assigned to Kellogg Switchboard & Supply Co. A universal cord circuit adapted for interconnecting magneto and common battery telephones lines is described. In addition to supervisory apparatus, manual and automatic ringing equipment is provided. A ringing key is adapted, when actuated, to connect the manual ringing apparatus and to render the automatic ringing apparatus ineffective upon connection being made with a magneto line circuit only.

1,113,460. October 13, 1914. ALARM SIGNALING APPARATUS; L. A. Meyers, Sauk Center, Minn., and Oliver H. Tracy, Plaza, N. D. This equipment is designed for ringing the telephone bells in a number of separated rooms. The signaling machine consists of a plurality of sets of pairs of contact springs. One set is connected in the line circuit, and the other set in the ringing circuit. Other pairs of movable contacts are connected in the line circuits and held so as to normally close the circuit. A rotable device is adapted to engage the contacts and move them to break the line circuits and close the ringing circuit.

1,113,499. October 13, 1914. SOUND MAGNIFYING APPLIANCE FOR TELEPHONIC AND TELEGRAPHIC PURPOSES; H. Smith, Magdeburg, Germany. The feature of this device, applicable to ordinary or telegraphone systems, is the provision of a coil inductively related to a coil connected at one end to a microphone on one side of a diaphragm. The first mentioned coil is connected at one end to a microphone on the other side of the diaphragm. The coils are adapted to be connected in parallel or series by means of a electro-responsive device.

1,113,537. October 13, 1914. TELEPHONE LIGHTING SYSTEM; J. A. Boze, Waxahachie, Texas. This invention is designed to provide means for illuminating the calling dial of an automatic telephone. A lamp is connected with the calling and ringing line circuits and arranged to be illuminated when the circuits are closed.

1,113,538. October 13, 1914. TIMEKEEPER FOR TELEPHONES; C. L. Braucher and E. R. Johnson, Cincinnati, Ohio. A mounting for a watch adapted to be placed on a telephone set is described. The plate in connection with the mounting is of such a length as to accommodate a pad of paper for making a record.

1,113,649. October 13, 1914. NON-INERFERING EXTENSION OR PARTY LINE TELEPHONE SYSTEM; L. Keller, Los Angeles, Cal.; assigned to Automatic Electric Co. This invention is adapted to automatic telephone systems only. Means are provided at each telephone for utilizing the common ground connection in calling. Circuits controlled at each telephone energize a ground cut-off relay. The actuation of any ringing key, one of which is provided at each station, de-energizes the ground cut-off relay, so that ground is restored to the line for enabling the calling subscriber thereon to signal the called subscriber.